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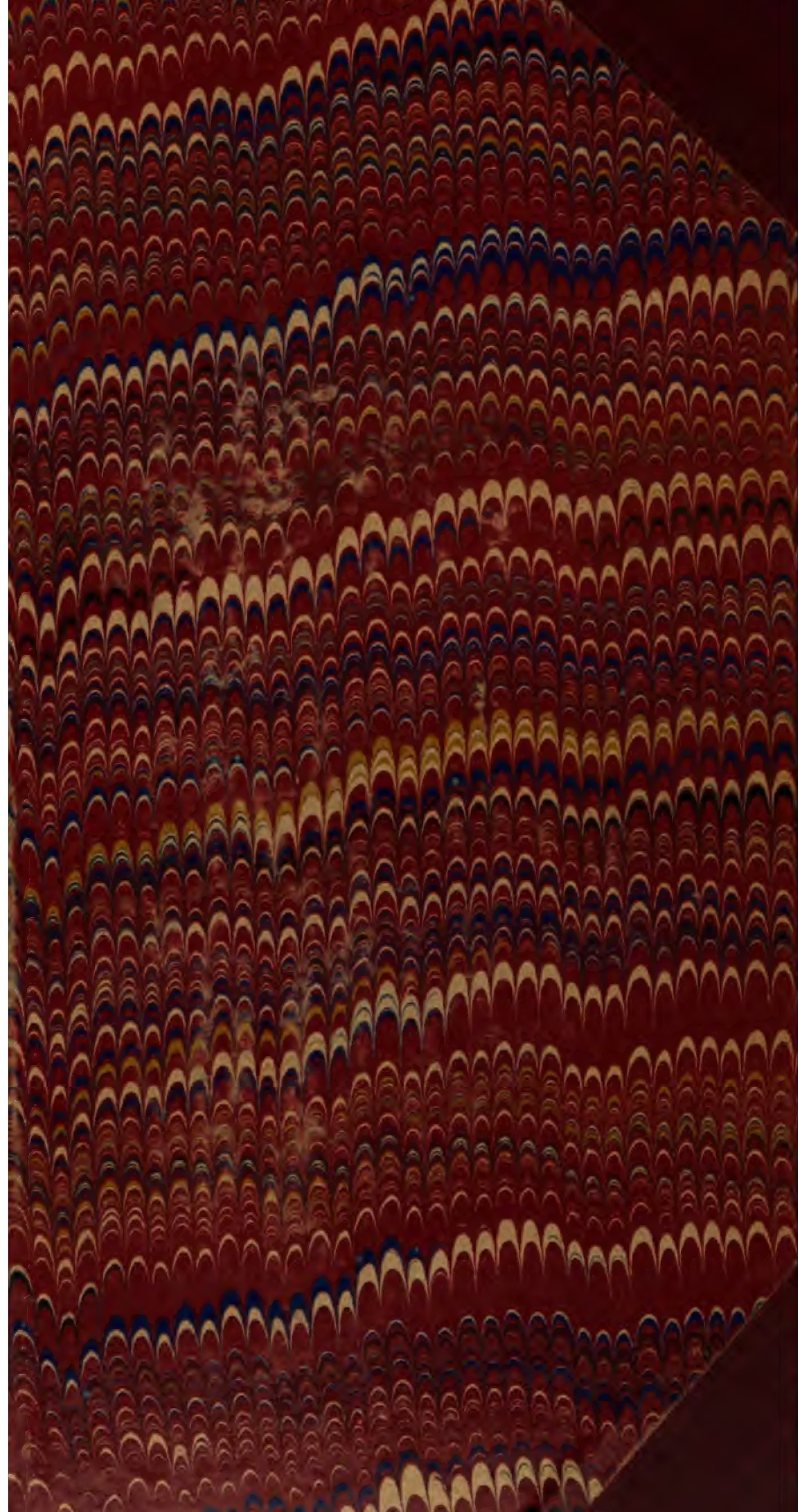
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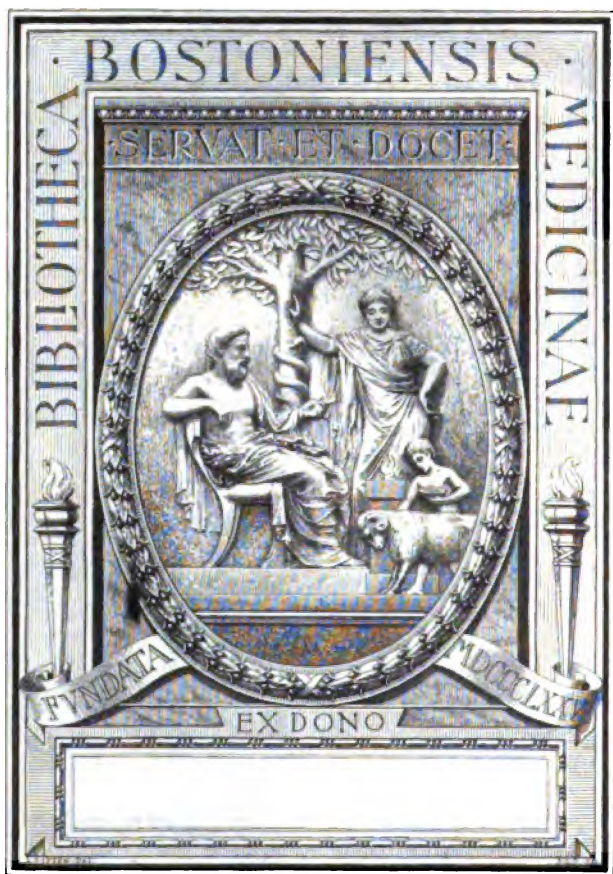
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ARCHIVES
OF
OTOLOGY

EDITED IN ENGLISH AND GERMAN

BY

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OF NEW YORK

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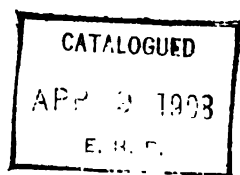
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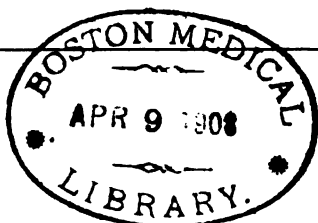
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ARCHIVES OF OTOTOLOGY.

REPORT OF A CASE OF LEPTOMENINGITIS WITH ONSET OF SYMPTOMS, SIXTEEN DAYS AFTER A RADICAL OPERATION, THE INFECTION REACHING THE MENINGES ALONG THE FACIAL NERVE.¹

By CHARLES NELSON SPRATT, B.S., M.D., MINNEAPOLIS,
MINN.

Mr. C. B., forty-five years of age, came under my care, May 15, 1905. He gave the following history:

January, 1904, he had an acute left mastoiditis. Operation was advised at the time but was not allowed. The acute symptoms subsided under treatment. The otorrhœa, however, continued for about four months. Since then the hearing has been very poor and he has had at times a slight pain in the ear. Otherwise he has been in excellent health. About seven weeks ago he had otalgia, some vertigo, and the discharge reappeared. This was scanty and of foul odor. On May 13th he noticed that the left side of his face felt "stiff," and that the mouth was drawn to the opposite side.

Examination May 15, 1905, showed a moderate discharge from the left ear, thin in character, and of a foul odor. No antrum or tip tenderness elicited on pressure. The anterior, superior, and posterior walls of the membranous canal were red and so swollen as to prevent a view of the tympanic membrane. Patient had some headache at night. Temperature, 98.5°. Pulse, 72. There was present a partial paralysis of left side of face. Hot irrigations were ordered and the patient placed under observation.

¹Presented as Thesis for membership in the American Laryngological, Rhynological, and Otological Society.

Five days later the facial paralysis seemed to be less marked. The œdema of the canal had increased but there was no mastoid tenderness. The headache and the otorrhœa continued. Temperature, 98.6°. Pulse, 72. Operation was advised but was not consented to.

On May 24th, there had appeared during the night considerable œdema over the left side of the head, this was most marked over the root of zygoma and mastoid; the ear was displaced downward and forward. There was slight antrum and tip tenderness. Temperature, 99.5°. Pulse, 75.

On May 25th, under ether, the usual curved incision was made through the soft parts to the bone, and the upper angle was extended forward. Although the cortex appeared to be intact, it was rather soft. On removing this, three distinct foci of infection were found in the large pneumatic mastoid. The first of these involved the cells at the root of the zygoma. The second was a cavity containing thick, yellow pus and granulations, anterior to the descending limb of the sigmoid sinus. The third focus was in the mastoid tip. This cavity contained 2-3 c.cm. of thick pus. The bone along the facial ridge was soft and the cells contained pus and granulations. The diseased bone was thoroughly removed down to the inner table, which appeared to be solid and intact. Neither the sinus nor dura were exposed. The posterior bony canal wall was removed, and the tympanum was cleaned of granulations. The head of the malleus was apparently the only portion of the ossicles left. This was removed. A Körner flap was made and the large bony cavity was lined by Thiersch graft, these being held in place by gauze packing. The incision was closed.

With the exception of the night after the operation, he had no pain. Post operative temperature was at no time above 99.5°. All of the gauze packing was removed and he left the hospital May 31st. As the ear discharged a small amount of pus, it was dressed daily. He felt well and spent a portion of each day at his office, attending his law practice.

On June 10th (17th day after operation), he said that he had been restless the previous night. This, he thought, might be due to the fact that he had gone to bed rather late. Temperature, 99°. Pulse, 90. That afternoon he began to

have a severe headache. At 10 P.M. he had a distinct chill and his temperature was 102.4° . During the night the headache was severe, and when seen the next morning, June 11th, he appeared somewhat dazed and answered questions slowly. He had vomited, but this may have been due to a dose of castor oil, taken a short time previously. There was no tenderness over the head or neck. The pupils were small and there was no deviation. Knee jerks were not increased; no ankle clonus. Temperature, 101° . Pulse, 84. At noon he had a second chill and temperature reached 103° . Pulse, 90. Mental condition was worse. Fundi were examined and disk margins found to be sharp and distinct.

Operation, June 11th, under ether, the incision of the previous operation was reopened and the cavity was found to be lined by epithelium, except the portion corresponding to the mastoid tip. The inner table everywhere appeared sound and intact. The dura over cerebellum and temporo-sphenoidal lobe was exposed and presented no evidence of infection. The sinus wall was thin, soft, smooth, and dented on pressure. A small flap of dura was turned down from temporo-sphenoidal lobe. This was followed by some bulging of the brain substance. The vessels of the pia-arachnoid were injected but otherwise no signs of meningitis were made out. As the meninges showed only a slight injection and the brain appeared to be normal, in color and consistency, exploration of the brain was not thought advisable.

The patient slept well during night and his condition in the morning showed little change. Temperature, 102.5° . Pulse, 100. Later in the day he became unconscious, the neck was rigid, and there was twitching of fingers, the patellar reflexes were not increased. Kernig's sign was present. Paralysis of bladder required the use of the catheter. That afternoon the wound was dressed and a large flap of dura was turned back. The temporo-sphenoidal lobe was explored with a grooved director. A rather marked bulging of the brain followed the turning back of the dura flap and the pulse jumped from 99 to 154. Patient died that night.

Autopsy.—The dura was white and showed no evidence of infection. The auditory and facial nerves, at their

entrance into the internal auditory meatus, were surrounded by a mass of yellow purulent exudate. This process extended upward in the sulci of both sides of the convex surface to the longitudinal fissure. The sides and superior surface of the cerebellum showed the same condition. The outer surfaces of both temporo-sphenoidal lobes were practically free from exudate. The vessels of the pia were injected.

It was clear that the infection had spread from the internal auditory canal to the outer surface of the brain, and from there to the base. Here the exudate was very dense so that the nerves were matted together. The medulla, on its inferior surface, was also covered with exudate. The process had extended upward along the outer surface of the cerebellum and cerebrum, so that the sulci of every portion of the brain, except the outer surfaces of the temporo-sphenoidal lobes, were involved.

Sections examined showed the exudate to consist of fibrin and leucocytes, with new formation of blood vessels. The *Pneumococcus* was found in sections and cover slips. The brain was noteworthy on account of the size. After allowing the fluid to drain, the weight was 2060 gms. The average weight of the adult male brain is 1360 gms. The patient had been a very intelligent professional man.

This case presents several points that merit further notice:

First: The extensive mastoid involvement, with a comparatively slight amount of pain and mastoid tenderness. With a sclerosed and thickened cortex, bone tenderness is often slight or absent. In a chronic or subacute mastoiditis, as in a chronic osteomyelitis of any other bone, pain and other subjective symptoms are usually not present. It is in the acute and rapidly spreading processes that subjective symptoms are marked.

Second: The late onset of meningitis. The patient had felt well and had been attending to his regular work

for about a week. During this time the infection had gradually extended along the facial nerve to the pia-arachnoid, with a rapid and fatal termination on reaching the latter.

Third: The virulence of the infection and rapidity of the course of meningitis. The patient was dead 70 hours after the period of unrest and 50 hours after initial severe headache.

Fourth: The course of the infection is unusual. The most common path is directly from the mastoid to the dura. The writer has, however, seen a radical operation done for a recurrent mastoiditis, in which the dura and sinus were exposed. The patient made a rapid recovery, leaving the hospital on the 11th day. On the 14th day after operation she had a chill and sudden rise of temperature. She was operated on for sinus thrombosis, with a fatal termination. Other paths of infection are along the carotid canal, through the lymph channels in the bone or blood-vessels or through the labyrinth. In this case the dura mater was not involved.

Fifth: An important question is brought out by this case. Did the grafting of the cavity have anything to do with the extension of the infection? At the onset of the acute symptoms, this was an open question. The findings of the autopsy, however, showed conclusively that the infections had not entered the cranial cavity from the field of operation. This was shown by the normal dura about this region. The fact that a facial paralysis had existed for some time previous to the first operation and that at the operation the bone about the Fallopian canal was found to be diseased, shows the origin of the infection. The localization of the exudate about the internal auditory meatus; the period of apparent recovery, followed by the sudden onset of symptoms, sixteen days after operation; the healthy condition of the bone and dura about the field of operation, all

point in a very definite manner that the infection had reached the meninges by extension along the facial nerve, and that the grafting had absolutely nothing to do with the course of the disease. Had any of the dura or sinus been exposed at first operation, grafting would not have been done.

DIONIN IN CHRONIC CATARRHAL DEAFNESS.¹

By B. ALEX. RANDALL, M.A., M.D., PHILADELPHIA, PA.

THE treatment of chronic catarrhal deafness has always been one of the most difficult problems of the aurist and the limited success attained has always been held an opprobrium to the specialty. Within our own ranks many are hardly undertaking its treatment, holding too despairing a view as to its promise of results. Other lines assuredly offer more brilliant possibilities; yet the host of sufferers tending to increasing disability and distress because of the advance of this insidious disease fully demands persistent effort by the aurist for their relief. The recognition of the cases of spongy bone-formation in the labyrinth in otosclerosis ought not to be any discouragement to labor for the betterment of even these conditions; while it differentiates them the better from the commoner and more amenable cases, and should make the prognosis of the latter both clearer and more favorable.

New measures must be sought, of course, if improvement is to be secured; and while I have always protested against "running after new gods" to the desertion of those methods of known but limited worth which we have long possessed, it has been the duty of every conscientious man to test whatever holds out promise of benefit. I have, therefore, been employing for tympanic medication through the catheter various drugs which

¹Read in the Section on Otology and Laryngology, Phila. College of Physicians, Dec. 19, 1906.

have seemed likely to do more to reverse the unfavorable progress than iodide in its various forms. Thiosinamine and its equivalent fibrolysin have not given to me or most others the results promised by their advocates; but dionin, which has done good service in ophthalmology in absorbing plastic exudates, seems better to meet expectations. Little irritation is caused by even 5 per cent. solutions in the Eustachian tube and tympanum and the effect has usually excelled that of similar measures. Without reporting at this time any series of cases as substantiating its value, I desire to call attention to its possibilities and invite others to test its employment.

In selecting cases for the test, it is not necessary to exclude those showing some impairment of the nervous apparatus. In many this seems wholly secondary to the middle-ear hyperplasia and promptly to clear up with its improvement. Advanced cases with wide sclerotic Eustachian tubes give only the better opportunity to carry the medication into the tympanic cavities. Yet we must be cautious in both these types to avoid all vigor in the inflation, lest we concuss the nervous apparatus by the force employed. The method which I have long advocated can hardly be improved upon (Tr. Penna. State Medical Society, *University Medical Magazine*, July, 1896), of cleansing well the nose and naso-pharynx by diligent spray, mopping the tube-mouths clean with an astringent, and spraying the medicated solution up the catheter with a simple hand-ball atomizer. With the Politzer bag one can drive up a coarser spray by throwing a drop or two of the solution into the catheter with a medicine dropper.

Among the non-essentials which contribute distinctly to the ease and success of the procedure, I would note that I use a pure-silver catheter, which is easily given the exact curvature which will best suit the case in hand, sterilized by heating to a glow in the flame; and I always employ a valveless Politzer bag with a ball-top too

large to enter the funnel extremity of the catheter. Mere apposition then gives air-tight connection of bag and catheter, with "ball and socket" junction which allows much freedom of relative position and no jarring in placing or separating the two. Much of the paraphernalia often advised for catheter injection thus is rendered superfluous and the simplicity of the procedure renders gentleness and precision far easier. Employed in this or any way preferred by the aurist, I feel sure that the dionin will give some satisfactory results and trust that it will be tested by colleagues in cases resisting other methods.

A CASE OF MASTOIDITIS COMPLICATED BY THROMBOSIS OF THE LEFT LATERAL PET- ROSAL AND CAVERNOUS SINUSES. OPER- ATION. REPORT OF AUTOPSY.

BY ROBERT LEWIS, JR., M.D.

(With Temperature Chart on Text-Plate I.)

William Vingerwich, a laborer and a native of Poland, aet. 22 years, was admitted to the Flushing Hospital on October 29, 1906, at 3.30 P.M.

On admission the temperature was 98° F., the respirations were 24 and the pulse was 92. After examination the case was diagnosed as one of pneumonia. About 8.30 P.M. the patient had a chill lasting twenty minutes, followed by a rise of temperature to 103.8° F. October 30th, no chill, the temperature during the day ranged between 98.2° F. and 102.2° F., the respirations were about 32 and the pulse was about 132. October 31st, the patient had another chill, the range of temperature was between 104.4° F. and 98.4° F., the respirations were about 40, and the pulse was about 148. November 1st, the temperature ranged between 96° F. and 104° F., the respirations were about 40, and the pulse was about 128. On this date the attending physician noticed a marked mastoid tenderness and I was called to see him. I saw the case late in the afternoon and found that the tenderness was very pronounced over the entire mastoid, also tenderness, along the line of the internal jugular vein.

Because of the patient's inability to speak English and because of the lack of an interpreter, no history of his previous condition could be obtained. No discharge had been noticed coming from the external auditory canal, but upon examina-

tion I found a few drops of pus at the bottom of this canal. On an attempt being made to clean the external auditory canal the cotton-tipped carrier broke through the drum membrane, which was very thin, and gave vent to a thick, purulent, odorless discharge. The condition as here found, led me to suppose that I was dealing with an acute case. I ordered the patient prepared for the mastoid operation and also for the probable exsection of the internal jugular vein.

Operation. The mastoid cortex was very hard but after I had removed it I found that the remaining mastoid, including the greater portion of the inner table, had been destroyed. Occupying the formed cavity was a quantity of thick, malodorous pus. The sigmoid sinus was absolutely obliterated, not even a clot occupying the former situation of the sinus. All that was left of it were portions of the lateral wall of the vein along the dura. This condition extended from a little beyond the knee, almost to the bulb. I removed the bone about half the distance between the knee and the torcular, and then curetted the remaining portion of the sinus as far as the torcular; the flow of blood was only fairly pronounced. The hemorrhage was controlled and the wound was plugged and I then proceeded to remove the internal jugular vein. No clot was found in the vein, but a bacterial examination, later, showed a streptococcus infection of the vessel walls.

During the next five days I did not see the patient, the temperature for each day as shown by the accompanying chart, showed marked remissions between 99.4° F. and 105.2° F. On November 4th, the conjunctiva of the left eye was reported to me, as markedly swollen and congested, and I suspected an occlusion of the cavernous sinus. On Nov. 6th, I visited him. His condition was very bad and I felt that I would like to explore the sinus on the other (the right) side, beyond the torcular. I removed the remaining portion of the bone covering the left lateral sinus as far as the torcular and curetted the sinus on the opposite side. I found no clot but the flow of blood was not at all free. The patient died about one hour after being returned to the ward. As his condition on leaving the operating table was very fair I was at a loss to explain his sudden demise, and believed at the time that it was due to a dislodgment, while curetting, of a

portion of the thrombus in the right *sinus*, and the embolus thus loosened passed, by way of the right internal jugular vein, into the circulation and reaching the heart prevented one of the valves of the heart from properly closing.

Dr. Dixon, as a result of his autopsy, does not believe this supposition to be true. However, from my experience with this case, I think such an accident is very likely to occur, and I do not believe it to be good surgery to attempt a curettement of the lateral sinus from the opposite side by way of the torcular Herophili, without first preventing, by means of a ligature around the internal jugular vein, a dislodged portion of a thrombus from getting into the general circulation. I have failed to find in the literature any reference to such a possible contingency.

Following is the report of Dr. Dixon's autopsy.

W. V. died in the Flushing Hospital November 6, 1906. Autopsy, 2 P.M., November 7th.

The body was that of a fairly well nourished male, age estimated to be about twenty-six. The entire surface was deeply jaundiced, and the back of the neck was considerably swollen.

Evidence of an extensive mastoid operation was present on the left side. An operative wound was also present in the line of the left internal jugular vein. The wounds were packed with gauze.

When the skull-cap was removed the dura was seen to be rather hyperæmic, but not markedly so. Division of the dura revealed a mild sero-purulent leptomeningitis over the vertex of both hemispheres. The brain was otherwise normal.

A small parietal clot (white) was found in the right lateral sinus near the knee. A purulent thrombus was present in the left inferior petrosal and cavernous sinuses, more advanced in the latter. All the small veins collateral to the left lateral sinus were thrombosed,—evidently the result of obliteration of the sinus.

The body of the sphenoid was discolored and the left sphenoidal cell was filled with a muco-purulent material. The ethmoidal cells were of normal appearance. No pus was found in the left orbit.

The right internal jugular vein was examined and found normal.

When the chest was opened the pericardial sac was found distended. It contained not less than six ounces of fluid of a clear amber color. The heart was soft and flabby to the touch.

A large firm thrombus was found in the right auricle which extended through the auriculo-ventricular opening into the ventricle where it was attached to the columnæ carneæ. A considerable portion of the auricular end of the thrombus, and all of the ventricular end, was dense and white. That portion attached to the auricular wall was thick and had evidently been present for a considerable length of time, but the balance of the auricular cavity was filled with a recent red clot sufficiently large to account for the fact that the ventricles were empty.

There was also a dense white thrombus in the left auricle which extended into the left ventricle, curved upward, and ended in tongue-like form near the aortic valves.

The right lung was somewhat cedematous, but the pleural cavity contained no fluid. The left pleural cavity contained a large quantity of purulent, foul-smelling fluid,—certainly not less than three pints; no means for accurately measuring it were at hand. Dense adhesions were encountered over the lower posterior portion of the lower lobe, and an abscess cavity, measuring 3 x 4.5 cm, was found in the lung at this point. The upper lobe was in a condition of red hepatization, and small abscess cavities were scattered through it. No tuberculous nodules could be found.

The stomach and intestines were distended with gas.

The liver was enlarged, and seemed to be rather soft and friable. No abscess was present. The gall bladder was distended.

The balance of the viscera was not disturbed.

Smears were taken from the abscess cavities of the lung and from the purulent thrombus in the left cavernous sinus.

The preparations all showed enormous numbers of micro-organisms, many probably putrefactive, but the one from the cavernous sinus showed in addition what appeared to be the spirillum of Vincent. No tubercle bacilli could be found.

The immediate cause of death was cardiac thrombosis.¹

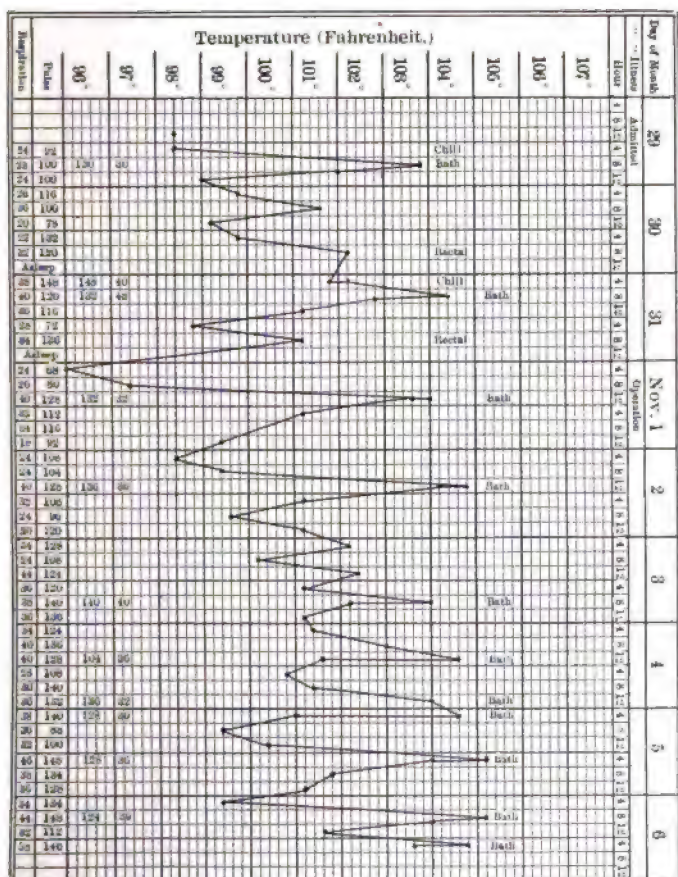
Very respectfully,

GEO. S. DIXON.

November 7, 1906.

¹ I do not think it at all likely that a detachment of a thrombus in this case had anything to do with death. Etherization may have hastened matters somewhat and increased the size of the clot in the right auricle, for it was full when opened, and the greater bulk of the clot was recent.

G. S. DIXON.



MASTOIDITIS OCCURRING IN DIABETIC SUBJECTS, WITH REPORT OF CASES.¹

By JOHN D. RICHARDS, M.D., OF NEW YORK.

IN the following report the writer refers to mastoiditis occurring in only those patients who in addition to having sugar in the urine (not transient) present the well marked general symptoms and the clinical picture of diabetes mellitus.

Those cases of mastoiditis with transient glycosuria; or with glycosuria which follows the anæsthesia but was not noticed previous to the operation; or glycosuria in the young, without the clinical symptoms of diabetes proper being present, are not referred to in this paper.

The report of such cases as cases of mastoiditis complicating diabetes is erroneous and inaccurate, and statistics so based are altogether misleading, in that they give a false sense of security in one of the gravest, one of the most fatal conditions with which the aural surgeon has to deal. The percentage of recoveries in this latter class of cases is, of course, very high. The percentage of recoveries in the first class is exceedingly low.

CASE 1. Male, aged fifty-eight. The known duration of the diabetes mellitus was three years.

On July 1, 1905, he had acute pain in the left ear. This continued with varying intensity until July 16th, when there was a sharp hemorrhage from the aural canal. On the following day there was a profuse discharge of creamy pus.

¹ Read in part before the Section on Otology, N. Y. Academy of Medicine, Dec. 13, 1906.

On July 20th, on account of pain, he consulted his physician. About this time the family noticed that the patient forgot the names of ordinary objects about the room.

On August 1st, patient was seen in the ear department of Vanderbilt Clinic, and I learn that he complained then of violent pain in the left ear, and that the mind was somewhat hazy, this being attributed to the violent pain from which he states he had suffered for about two weeks.

Examination of the ear shows bulging membrana tympani, sagging of the postero-superior canal wall, and marked general mastoid tenderness. Incision of the drum was made, and in a few days the marked tenderness had abated. Three days later, Aug. 4th, pain recurred. A second, and later, a third incision of the membrana tympani was made. A profuse discharge of pus was now issuing from the canal. The patient expressed himself as feeling well. On Aug. 16th he appeared again at the clinic, and at this visit decided aphasia was noticed.

On Aug. 21, 1905, fifty-one days after the initial earache, I first saw him and an examination revealed the following condition:

He was a large plethoric man of middle age. He suffered from slight dyspnoea, and preferred a semi-recumbent position. The odor of acetone could be detected on the breath. The skin and lips were dry; the tongue, which was large and flabby, was tremulous, abnormally red, and deeply fissured. Heart and lungs negative.

Ear Examination. Aural canal was filled with creamy pus to which distinct pulsation was imparted. There was marked bulging of the membrana tympani, and sagging of posterior and superior cartilaginous canal walls. There was general mastoid tenderness and cedema. The swelling of the scalp tissues extended well back toward the occiput.

Mental Examination. His mental condition, though interesting, was somewhat difficult to estimate. He appeared to take little interest in the conversation of those around him. He would occasionally, however, interrupt the conversation with a yes or no, or a nod of the head, as if to contradict or confirm certain statements. His interruptions were always apropos, and he appeared to have a clear conception of

what was said. His attention, for the most part, was concerned in an attempt to express his desire for water. He would do this by saying—"Give me," and then being unable to recall the word "water" would point to the pitcher. When asked if it was a chair that he wished, he would shake his head, showing that if a wrong name was given the object he appreciated the error. If asked if it was water that he wanted, he would nod yes,—showing that he recognized the correct association of the object with its proper name, when the name was mentioned. He could not recall his own name, and when asked to write it was unable to do so,—in fact he could not form his letters, and the attempt was mere scribbling. When his name was told him, he recognized it as correct. If then asked what his name was, he would say, "sure." All objects shown him were called "yes," "no," or "sure." This group of words seemed dominant. At times he would utilize another group of words with which to answer all questions and by which to call all objects. As a rule, however, he stuck to the "yes," and "no," and "sure" group. When shown a 25 cent piece and asked its name, he said "sure"; when asked if it was 15 cents, he shook his head; when asked if it was a quarter, he nodded "yes." When asked again what it was, he said "sure." On placing a knife in his hand, the eyes being closed, and being asked what it was he would say, "sure." The same result was obtained when a bunch of keys was rattled by his good ear. He quickly became fatigued mentally and would not answer, appearing not to have heard the question; if the interrogation were persisted in, his answer would be "sure," "yes," or "no," although the answers were altogether irrelevant to the questions asked.

Eye Examination. The left pupil, corresponding to the diseased side, was dilated and considerably larger than its fellow; neither pupil responded quickly to either light or accommodation. The fundus of each eye was negative.

Reflexes. The reflexes generally were good. There was a slightly exaggerated right patellar reflex. Station was excellent. The gait was steady. There were no areas of anæsthesia. The grip of each hand was poor, and about equal in both.

Urine. The quantity of urine passed in 24 hours was not known. From the son's statement I gathered that it was much in excess of the normal quantity. The examination showed 5 per cent. sugar. Acetone and diacetic acid were not examined for, though the odor of acetone was easily detected on the breath.

Prognosis to family. In spite of an unfavorable prognosis, the family desired an operation.

Operation. Chloroform anæsthesia. Upon opening the mastoid process there was a profuse gush of pus constituting an epidural abscess under high pressure. The interior of the mastoid was thoroughly disintegrated and filled with a mass of pus and granulations. The entire vertical sinus groove had been eroded. The sinus was covered with large black, disintegrating granulations. The dura above the tegmen antri and tympani was similarly involved. A Schwartze-Stacke operation was done. Just anterior to the knee of the sigmoid sinus the dura over the temporo-sphenoidal lobe showed an area of ulceration, the size of the thumb nail. This area was surrounded by fungus granulations. This appeared to be evidence of long-continued high pressure, and I thought at the time that it might have some possible bearing upon the aphasia, as on several occasions I had seen aphasia result from epidural abscess. The mastoid emissary vein was thrombosed throughout its course in the bone and for some distance into the tissues of the scalp (mixed infection). The vertical limb of the sigmoid was occupied by a thrombus, and the external wall of the vessel was exsected throughout the thrombosed area, when free return flow spontaneously occurred from both the torcular and the bulb end of the sinus.

Upon the suggestion of the attending neurologist, the temporo-sphenoidal lobe was explored systematically with a long thin-bladed knife, with negative results. Patient returned from operation in good condition. Later he was noisy, and constantly clamoring for water—saying, "give me," not being able to recall the word *water*.

On August 22d, the day following operation, his general condition was about the same as immediately before operation, and in attempting to ask for water he would say, "give

me," and then point to the pitcher. He was quiet throughout the day. He received large doses of codeine.

On August 23d, he was somewhat drowsy and showed a tendency to sleep. He could be easily awakened, but would not speak. The only time he appeared to understand me was when I asked him to squeeze my hand, which he did. At 12 noon he had a slight convulsion. This began with twitching of the right side of the face—the side opposite operation. The eyes were directed up and to the left. There was slight cyanosis. The duration of this attack was two minutes. 12.20. Twenty minutes later he had a second convulsion which began at the angle of the mouth, extended over the entire right side of the face, then involved the right arm, the movements commencing first in the fingers. The head was turned to the right side; the eyes were directed up and to the left; the left arm and leg were perfectly flaccid and the tongue quiet. There was marked cyanosis in the attack which lasted two minutes, during which time he was unconscious. At 3 P.M. he had a similar convulsion in which both arms and both hands twitched. The fundus of the left eye showed haziness. The amount of sugar in the urine has increased to 7 per cent. He takes nourishment, and drinks all the water that is given him.

August 24th. Condition was similar to that of the previous day. At times he appeared somewhat better and understood what was said to him. He was still unable to speak. The right elbow and sacrum showed areas of beginning pressure necrosis. The mastoid wound looked dead.

August 25th. Patient is restless and semi-comatose; voided urine involuntarily. Temperature which has been low, has risen to 102°; pulse 102. Sacrum and elbow show large pressure ulcers.

August 26th. Patient passed into deep coma and died. A specimen of cerebro spinal fluid taken two days before death showed streptococci.

Autopsy, Laboratory. N. Y. Eye and Ear Infirmary. Upon removing the calvarium a considerable quantity of clear fluid escaped. This was extradural. When the dura was removed, a thin clot was found over the left parietal lobe

which had ascended from a subcortical hemorrhage represented by a clot about three-quarters of an inch in diameter. This hemorrhage was evidently of some weeks' standing. The subarachnoid space was filled with a slightly cloudy fluid in considerable quantity. Immediately behind the fissure of Rolando, near the superior longitudinal fissure, there was considerable thickening and there appeared to be a greater collection of fluid here than elsewhere. (This may have had some bearing upon the convulsions.) The remaining portion of the left lateral sinus was thrombosed to the torcular. The thrombus was continued into the right lateral sinus to about two-thirds of its length—a short distance into the straight, but not into the superior. The left superior petrosal was thrombosed, as were also many of the collateral veins in the vicinity. The right petrosal sinuses were empty. (This thrombosis evidently resulted after the operative procedure.) Smears from the subarachnoid fluid showed cocci singly and in pairs.

Cause of Death. Diabetes mellitus; meningitis; general sinus thrombosis, and subcortical cerebral hemorrhage.

A point of particular interest in this case is the cause of the aphasia, inasmuch as there were several factors which may have been responsible for it. The case illustrates the difficulty of attaching the proper clinical importance, from a surgical standpoint, to this symptom, and the danger of assuming that the temporo-sphenoidal lobe is the necessary seat of the disturbing lesion.

1st. The diabetic condition in itself may have been responsible for the aphasia. Against its being so, is the fact that though the patient had been known to have had diabetes for three years, and had been during a portion of the time under the ablest medical supervision, the aphasia was not noted until after the onset of the ear disease.

2d. Epidural abscess. This condition alone occasionally produces an aphasia, a dilated pupil of the corresponding side to the lesion, or an optic papillitis. I have in

several cases seen aphasia result from epidural abscess. The presence in this particular case of an area of ulceration of the temporo-sphenoidal dura, significant of long-continued high pressure, would rather point to the correctness of the supposition than otherwise, had not there been found at the autopsy an altogether independent lesion (the cerebral hemorrhage) to which with more probability the aphasia could be attributed.

3d. Meningitis. This condition is also a cause of aphasia, and was present in this case. It is highly probable, however, that the meningitis had no bearing upon the aphasia, for the aphasia was noted about thirty-four days prior to the patient's death. Had purulent meningitis been the cause, death would probably have resulted earlier, and a more definite clinical picture of meningitis would have developed during this long period.

4th. The postmortem appearance and the size of the subcortical cerebro-hemorrhage made it the most probable factor responsible in the aphasia.

5th. Considering the nature of the case (a suppurative ear disease, with symptoms pointing to intracranial involvement) the diagnosis based upon the percentage of probabilities could scarcely have been other than temporo-sphenoidal abscess, particularly in view of the fact that the aphasia was rendered more important as a localizing symptom when taken in conjunction with the agraphia which was present. This combination pointed not only to the temporo-sphenoidal lobe as the seat of the lesion, but that the lesion was sufficiently deep to involve certain motor tracts.

The various points in regard to the aphasia in this case I have mentioned simply to show how difficult it is to attach the proper surgical importance to a symptom which is regarded too highly as a localizing symptom. No doubt the function of the temporo-sphenoidal lobe is interfered with when we get certain forms of aphasia,

but this does not necessarily mean that the temporo-sphenoidal lobe is itself the seat of the lesion. The causative factor may be in an adjacent lobe, causing aphasia by transmitted pressure; it may be totally extra-dural, as in epidural abscess; or it may be due to a general disease having no particular connection whatever with the cranial cavity.

CASE 2. Operated upon at St. Mark's Hospital, December 1, 1905. Plethoric male, aged fifty-one. The duration of the diabetes is indefinite, as the general symptoms were not of such severity as to have attracted the patient's attention seriously to himself. During the past year he has failed somewhat in strength and weight, and, though not to any considerable degree, he has noticed that he becomes easily fatigued. He suffers from thirst and drinks a large amount of water during the day, and considerable beer. He has been in the habit of arising several times in the night to pass urine, and during the day voids urine frequently. Pruritis has troubled him from time to time.

About five weeks prior to his admission to the hospital he contracted a severe cold in the head. Several days later the ear became stuffy and the seat of intermittent pain, which was not severe, and which soon subsided spontaneously. He noticed at this time a marked loss of hearing. About ten days after the onset of the ear symptoms there was a slight discharge of pus from the ear. This, together with the diminution in hearing, has continued to the present time.

During the past week he has suffered at night with dull pain in and around the ear, and headache of moderate severity. The aural discharge has increased in quantity, otherwise he feels well. There have been no sweats, and if any fever, not sufficient to have attracted his attention. Heart and lungs are negative; pulse and temperature normal. The urine contains 3 per cent. sugar. Specific gravity, 1.028. No albumin. Diacetic acid and acetone were not examined for.

Present Examination. The auditory meatus is filled with creamy pus. There is marked bulging of the membrana tympani which has been bellied out into the auditory canal by excessive pressure from within; through a perforation of

the postero-inferior quadrant of the drum, pus issues with pulsation and rapidly fills the depth of the canal. Upon being wiped away, there is drooping of the superior canal-wall and marked constriction of the fundus. Mastoid antrum and tip tenderness are both well marked. The point of greatest tenderness—which is exquisite—is along the postero-inferior border of the mastoid. There is no oedema in this region.

The disproportion between the amount of elicitable pain on pressure (the tenderness) which is exquisite—and the absence of pain when no pressure is made, is striking. This patient had received no treatment for his general condition prior to the operation, nor had he been on a suitable diet.

Operation. Mastoid cortex negative. Upon removing groove from base to tip, thin, yellow, non-odorous pus issues from the interior of the mastoid in sufficient quantity to flow over the bone—to this pulsation is imparted. The interior of the mastoid is absolutely disintegrated, and the bone is represented by a mere shell filled with a broken down mass of granulation and pus. The tip of the mastoid is necrotic and mushy. The vertical limb of the sinus and the adjacent cerebellar dura are bare of their super-imposed bony plate and invested by large black granulations which form the base of the epidural abscess. There is a slight erosion of the tegmen antri posteriorly, with exposure of dura. The cells encased in the posterior zygomatic arch are extensively invaded, and the aditus blocked by a mulberry mass of granulations. Both the tegmen antri and the remaining portion of the visceral plate covering the anterior face of the cerebellar dura as far forward as the posterior semicircular canal, were removed, so that the entire base of the cavity was formed by dura. Plain gauze was used for packing throughout. The further healing of this case was uneventful, and essentially that of an ordinary mastoid wound, with the tendency of the granulations to more than usual exuberance. The urinary examination up to the time of the patient's discharge remains the same. He was receiving codeine in large doses, but his station was such that the restriction of his diet to proper articles of food was practically impossible.

CASE 3. Male, aged seventy years. Three years ago the patient suffered from marked general fatigue, cramps in the legs, excessive thirst, and increased amount of urine, the sticky quality of which caused him to consult a physician who detected the diabetic condition. After a year of strict diet and medication (which from the patient's statement I take to be codeine given in increasing doses) the sugar disappeared. No further examination of the urine was then made until the present ear trouble, which dates from March 25, 1906.

On March 22, 1906, patient had a cold in the head accompanied by a marked general depression, and that combination of symptoms which it has become customary to report as gripe. In three days there was acute pain in the left ear. The membrana tympani was red and bulging; temperature, 99° and a fraction. The drum membrane was incised and a profuse discharge of pus followed. Owing to continued bulging of the drum three subsequent incisions were made, and though there was no mastoid tenderness during this time, the ear was discharging profusely. The patient was put upon strict diet and increasing doses of codeine. The urine in twenty-four hours amounts to three quarts, and over 3 per cent. of sugar was present. There was neither albumin nor casts; no diacetic acid or acetone.

The profuse discharge continued; the lumen of the cartilaginous canal became gradually narrowed by sagging of the superior and prolapse of the posterior walls, and about April 20th, mastoid antrum and tip tenderness were noted—neither was marked. Several days later, post-mastoid tenderness and cedema developed, and slight headache, referred to a point above and behind the base of the mastoid, occurred. The temperature up to this time had not risen above 99.6° F.

He had a double aortic murmur and a mitral regurgitation. I am indebted to Dr. B. F. Knause for this history.

On April 27th (the day of operation, when I first saw the patient), the condition was the same as that of the 26th. From the records of the New York Eye and Ear Infirmary the following notes on the operation are taken.

The mastoid cortex is discolored. The tip of the mastoid is perforated posteriorly, and through the perforation pus

issues with pulsation. Pus escapes from the tissues of the neck. (The tip in this case had broken down and disintegrated, and the tissues in the upper portion of the neck formed the base of a large abscess cavity). The sinus was exposed the full length of the mastoid wound (the inner plate had been eroded by the disease). The dura was exposed from the zygoma to a point an inch behind the sinus knee. Plain gauze dressings.

The further history of the case is uneventful, and is that of an ordinary mastoid wound. For the first ten days the wound showed the usual post operative appearance seen in these diabetic cases.

CASE 4. Male, aged forty-six years. Duration of diabetes unknown. Patient has suffered for about a year from loss of weight and strength, pruritis, excessive thirst, the recurrence of crops of boils, and the passing of large quantities of urine.

During the latter part of June, 1906, he was seen by Dr. B. F. Knause of Brooklyn, who incised a furuncle of the left ear. This condition led to an immediate examination of the urine which revealed the diabetic condition. The swelling of the cartilaginous canal was such that the fundus of the ear could not be seen on account of a diffuse external otitis. There was no aural discharge and the canal was packed. The mastoid was not tender. The temperature was a fraction of a degree above normal. The patient was passing five quarts of urine in the twenty-four hours, which showed a specific gravity of 1.030, sugar 10 per cent., and diacetic acid and acetone present. He was put upon strict diet and increasing doses of codeine.

After several days' packing a view was obtained of the fundus of the canal, and it was seen that the drum membrane participated in the general redness, but that there was no bulging present. This appearance of a diffuse external otitis without indication of mastoid involvement continued for about two weeks the temperature occasionally rising during this time to 99° plus, F.

On July 15th, there was questionable mastoid tenderness, which in the absence of any bulging of the drum was thought

to be possibly due to the furuncular condition. He continued the same until July 26th, when an examination revealed the following condition. On the posterior wall of the cartilaginous canal there is a furuncle from which may be pressed a small amount of creamy pus. The superior canal wall at this point is sagging and reddened; the anterior wall swollen, and the lumen of the canal so constricted as to prevent a thorough examination of the fundus. The membrana tympani, however, is seen to be reddened. The question of bulging is doubtful. External to the drum in the deep portion of the canal there is a small amount of desquamated epithelium; also a little pus, which in the absence of any demonstrable perforation in the drum is taken to have drained down from the furuncle. The general appearance of the canal is that of a diffuse external otitis supervening upon a furuncle.

Firm pressure over the mastoid antrum elicits questionable tenderness; tip tenderness is obscure. Over the posterior inferior border of the mastoid tenderness is positive and there is slight cedema. The patient complains of headache of moderate severity, which he refers to a point a little above and behind the base of the mastoid process.

Temperature is normal; pulse 88 per minute—increasing upon slight exertion to 116. Eye grounds are normal. He complains of general itching of the skin. There is a moderate sized boil upon the left forearm.

He is passing at this time five quarts of urine daily. The examination by Dr. Edwin G. Zabriskie (Laboratory of the Manhattan Eye and Ear Hospital) shows specific gravity 1.030; trace of albumin, sugar 10 per cent., diacetic acid and acetone present.

Operation. Chloroform anæsthesia. As the conditions pointed to extensive posterior involvement, with epidural abscess, and the element of time being of such importance, large posterior scalp flaps were made and the mastoid emissary sacrificed. This vessel did not bleed from its canal in the skull, which suggested the presence of sinus involvement. The mastoid cortex was not discolored. A wide groove was made in the bone from base to tip, and an ounce or thereabouts of thin fluid non-odorous pus issued with pulsation. The entire mastoid cortex was quickly removed with broad

nosed rongeurs and the interior of the bone was found to be disintegrated. The vertical sinus limb, and that portion of cerebellar dura as far internal as the posterior semicircular canal, were exposed by the disintegration process, and formed the base of an epidural abscess. The dura of the sinus limb was smooth and free of granulations. It reflected the image of the light held for illumination as if the vessel was covered by a thin layer of liquid. It was a dark slate color, as seen through a faint white film; it appeared gangrenous. The vessel was flattened unevenly, and a distinct thrombus could be felt in its lower portion. In the absence of symptoms pointing to septic absorption, and in view of the post mortem findings after operative interference in Case 1, this thrombus was treated as a non-infective clot due to vascular changes incident to diabetes, and it was not disturbed at the time of operation in order that the operation might be more quickly terminated.

The sinus groove was removed well down into its horizontal position, when healthy bone was reached. The cells immediately below the posterior semicircular canal leading inward toward the jugular bulb were extensively broken down and the bulb was exposed. The tegmen antri was necrotic and was removed. The pneumatic structure in the solid angle of the semicircular canal had been broken down so as to leave the whole series of arches well exposed to view. The inner plates of the mastoid were removed so that the base of the cavity was represented throughout by dura. The area of diseased dura extended posteriorly from the middle of the vertical sinus limb over the lateral aspect of the cerebellum.

On the second day following operation the wound on account of its fecal odor had to be dressed. The posterior incisions had sealed, though firm union did not exist. The dura of the vertical sinus limb was necrotic, moist, and sloughing. The wound showed no vitality, and in the depth of the cavity there was a thin slate-colored fluid of fecal odor. With scissors the gangrenous external sinus wall was removed, together with that portion of the thrombus corresponding, but no attempt was made to establish return flow from either the torcular or bulb ends of the vessel. Plain gauze was used for dressing, iodoform gauze being abandoned

on account of the possible renal irritation. Daily dressings were thereafter made and on August 8th the wound had lost its fecal odor. There was some sloughing of the upper ends of the mastoid muscle fibres in the lower angle of the wound. A few granulations were springing from portions of the bone. The dura of both cerebellum and sinus had cleared itself, and though there were no granulations over this area it had assumed a healthy whitish blue appearance, significant of beginning repair.

There is marked pulsation of the whole exposed area of dura which formed the bottom of the cavity. A small boil is present in the extreme posterior end of the horizontal incision. Patient feels sufficiently well to be up and about. Urine has decreased in the twenty-four hours to forty-three ounces; sugar 10 per cent.; acetone and diacetic acid are still present, with a trace of albumin. The later history of the wound was that of an uneventful healing.

The urinary examination at the present time, February 26, 1907, by Dr. Edwin G. Zabriskie (Laboratory of the Manhattan Eye and Ear Hospital). Amount in twenty-four hours, 5 quarts, 4 ounces. Specific gravity, 1.026. Sugar, 10 per cent. Albumin $\frac{1}{2}$ gram to the litre. Granular and hyaline casts present. Acetone present.

In addition to the four cases operated upon by the writer, he has seen five others—the operations and the subsequent results. If from this limited number correct conclusions may be drawn, he has been impressed with the following:

1st. That the mastoid invasion is somewhat characteristic. There is an acute otitis which may be—and frequently is not—accompanied by pain; a persistently bulging drum membrane which does not subside upon incision, or repeated incision; a gradual narrowing of the cartilaginous canal, through sagging of its walls or through thickening due to an associated external otitis. An external otitis may initiate the aural condition; mastoid antrum and tip tenderness, which develop late—or, if early, are but slight and variable; low temperature

and the absence in the mastoid region of acute inflammatory phenomena, indicating a poor fight on the part of the tissues; later, post-mastoid tenderness and oedema develop, which, with headache, localized at a point slightly above and behind the base of the mastoid indicate extensive destruction of the bone and epidural abscess—this is the course which many of the cases have run.

2d. The slow march of the mastoid symptoms and the absence of marked inflammatory phenomena (until late) argues not so much a virulence of infection in certain cases with extensive destruction as a low vitality of tissue. The post operative condition of the wounds also points to this; and the interior of the mastoid at the time of operation as a rule furnishes further proof in the presence of large, pale, flabby granulations. Were the infection virulent these granulations, which are of low vitality, would not attain to such size before being disintegrated. Their size is evidence of non-virulence.

3d. The good effect of a proper diet, and the administration of codeine in increasing doses was striking in two of the cases that recovered.

4th. The mortality in these cases is high. Six of the nine cases died. Death occurs, as a rule, within the first few days following operation, in diabetic coma.

5th. Anæsthetic. Of the three cases that recovered two were given chloroform, one ether (ether was administered in this case owing to the presence of a double aortic and a mitral regurgitant murmur). One of the chloroform cases passed into collapse and narrowly escaped death during the primary stage of the anæsthesia. (This was the patient whose urine amounted in the twenty-four hours to five quarts, with 10 per cent. sugar and both diacetic acid and acetone present.)

Of the six cases that died, four were given ether and two chloroform. One of these patients passed into diabetic coma during the administration of the anæsthetic, from which the patient did not emerge—in this.

instance ether was given. In plethoric adults of advanced years I believe chloroform to be the safer anæsthetic.

6th. Following the administration of either chloroform or ether, there may be an increase, a decrease, or a temporary disappearance of the sugar in the urine.

7th. Following anæsthesia, dyspnoea may develop. It more commonly occurs in the cases to which ether is administered, and is of particular ill omen.

8th. A successful issue depends largely upon the rapidity of operation and the short duration of the anæsthesia. That it does not necessarily depend, however, upon early operation is shown by the three successful cases of the writer, in each of which the ear involvement was of one month's duration or more—in all of which there was extensive destruction with epidural abscess; and in one, there was in addition, a thrombosis of the sigmoid sinus. I do not, however, advocate delay in operative interference.

Rapidity of operation cannot be over-estimated. I have seen no case recover in which the operation lasted thirty minutes.

9th. The bone should be removed well beyond the apparent limit of involvement and a very thorough operation done, as the tissues are suffering from a dyscrasia and are more extensively involved than is indicated to the eye. It is safer in those cases where there is extensive destruction of the interior of the mastoid down to or through the dural plates, to remove these visceral plates entirely, so that the base of the wound is formed altogether of dura, and I advocate this procedure in this class of cases for the following reasons:

(a) By removing the interior of the mastoid or through its destruction by the disease the nutrition of the visceral plates is seriously interfered with, and particularly where a dyscrasia is present are they likely to suffer. This is shown first by the frequency with which the dural plates are broken down and destroyed in the diabetic cases,

and the rapidity with which this occurs; and second, by the poor character of the granulations which spring from them if they are allowed to remain. Granulations springing from such a bone pit are large, exuberant, flabby, and frequently incapable of organization, indicating a depraved base. In examining the bottom of these cavities we not infrequently find portions of the visceral plates which remain dead,—throw out no granulations,—and which we failed at the time of operation to detect as dead—owing to the deceptive appearance of thin hard bone.

(b) We remove in the most effective way all bone that may be devitalized beyond its ability to repair, and avoid therefore the chances of an unhealed wound which will of itself prove a drain upon an already debilitated patient; and we decrease the likelihood of a secondary operation which will of itself almost certainly prove fatal.

(c) Time is saved by this procedure—by exposing the dura at a given point sufficiently for the insertion of one blade of a rongeur between it and its overlying plate, we can separate the two and remove with the utmost rapidity the dural plate and its superimposed bony structure with the rongeur. In fifteen minutes total exenteration with removal of the visceral plates may be accomplished.

(d) The danger resulting from the exposure of dura is practically nil as compared with the advantages gained by this procedure. In addition, we secure the best possible base from which granulations may spring. The bulging of dura into the wound lessens its depth and shortens healing, and the pulsation of the brain when large areas of dura are exposed furthers drainage to a considerable degree.

It is bad surgery to sew up in these cases, even to the slightest extent, the soft tissue over bone pockets—as, for instance, the upper angle of the wound over the posterior root of a zygoma which has been excavated. It

is best to expose the dura and obliterate the dead space by allowing the soft tissues to sink in and meet it, and it is just here that the pulsation of dura is of great advantage in securing drainage. If the bone pocket is allowed to remain and is covered over by flaps, the granulations which arise from this pocket are so exuberant as to block drainage. I have seen secondary operation necessary on this account, and death follow from just this error which appears so trifling.

10th. Diabetes seems to predispose to or be accompanied by vascular changes, as was shown by sinus thrombosis in one case and a subcortical cerebral hemorrhage and sinus thrombosis in the other; and that the removal of the thrombus in the later case and the establishing of return flows from the torcular and bulb ends of the sinus resulted in an extensive general thrombosis of the intracranial sinuses. When we find in diabetic cases a sinus thrombosis, and there is an absence of symptoms pointing to septic absorption, I believe it safer not to disturb the clot further than to open the vessel and remove the main portion of the thrombus and the corresponding external sinus wall, without establishing return flows; otherwise we may get extensive clotting in the remaining intracranial sinuses and unwittingly contribute toward death. (This was illustrated in Case 1. Case 4 illustrates the successful application of this principle.)

11th. The claim made by some that those cases showing 3 per cent. of sugar and over in the urine, if operated upon always terminate fatally, is unfounded—all of the cases of recovery had 3 per cent. or more; and of others that if diacetic acid and acetone are present the cases have a fatal termination, is also untrue.

Case 4 illustrates the fact that neither the amount of urine passed in twenty-four hours (5 quarts), the percentage of sugar (10 per cent.), nor the presence in the urine of diacetic acid and acetone (both present) together and in conjunction with the severest general symptoms

of the disease—excessive thirst, exhaustion, loss of weight, recurring boils, pruritis, and an easily disturbed pulse—is of definite and certain prognostic value, as the case recovered in spite of the fact of extensive mastoid destruction, epidural abscess, and thrombosis of the sigmoid sinus.

12th. So far as this limited number of cases has enabled me to determine, I consider dyspnoea (if the value of symptoms considered singly is of importance)—whether this develops prior to operation or subsequent to the anæsthesia—the one symptom of the greatest prognostic value. It points almost certainly to a fatal termination, in no instance have I seen such a case recover.

THE PROGNOSIS OF OPERATIVE PROCEDURES ON THE MASTOID PROCESS OF DIABETIC SUBJECTS.¹

By E. L. MEIERHOF, M.D.

THE element of risk in surgical procedures on the diabetic has not received all the attention that it deserves. Some of the latest and best works on general surgery barely touch on the subject. This indifference seems mainly due to the idea that under rigid asepsis the element of risk is very much diminished, even in the diabetic. That this is no doubt true is due to the fact that a considerable amount of general surgery is performed on non-suppurative cases, and with the absence of local or general infections in a very large percentage of cases the risk is kept at a minimum.

The otological surgeon rarely operates on cases where there is no suppuration, and consequently has to deal with more or less severe local infections accompanied often with systemic involvement. For this reason the otologist should have a greater interest in this question than the general surgeon.

At the meeting of the American Otological Society in the year 1895, Buck read a paper dealing with this subject. While this paper is the earliest one that I have been able to find dealing with the question of prognosis alone, there has been quite a number of contributions dealing with the liability of purulent otitis becoming

¹ Read before the Section on Otology, N. Y. Academy of Medicine, Dec. 13, 1906.

more readily complicated in the diabetic than in the non-diabetic. In his paper Buck was able to refer back as far as 1860 for the earliest reported coincidence of mastoid disease and diabetes. From this date to the time of the reading of the paper, he gathered ten cases reported from various authentic sources, together with four cases in his own practice. His deductions from his own experience and the study of cases from literature were that the mastoid operation in the diabetic is attended with a greater degree of risk than in the non-diabetic. Furthermore, he thought that the danger of a fatal issue would be materially lessened if the operation were undertaken earlier in such cases.

During the past ten years there has been a number of contributions dealing with purulent otitis and its complications in the diabetic. These contributions, in great part, deal with reports of cases, and from a study of these reports we are enabled to obtain a broader view on this subject. It is thought that there is something characteristic of mastoiditis in the diabetic, in so far that the disease manifests itself frequently in the mastoid without marked evidence in the tympanum; and furthermore the destruction of bone takes place more rapidly and extensively than under ordinary circumstances. The danger of the after effects of the narcosis is viewed with greater apprehension in these cases, as a number of fatalities have occurred 24 or 48 hours after operation, due to diabetic coma.

The incentive for writing on this subject is an experience with one of our well-known otologists, called into consultation in a case of acute purulent otitis with marked mastoid involvement, occurring in a diabetic subject and presenting every indication for operation on the mastoid. The age of the patient, sixty years, and the presence of $2\frac{1}{2}$ to 4 per cent. of sugar led the consultant to give a very unfavorable prognosis to the family of the patient, on account of his experience in a series of eight

cases occurring in his own practice or seen in consultation. All of these cases died within one to three or four days after the operation. Great stress was laid upon the danger of general narcosis in cases where the sugar was 3 or more per cent. The day after the consultation, the writer of this article became ill from an attack of grippe, so that another otologist took charge of the case. The substitute called into consultation another well-known otologist who did not by any means share the gloomy prognosis of the first consultant, so the family gave consent for an operation, which was done five days after the first consultation,—and about thirty-five days after the beginning of the otitis. The indications for operating on the mastoid only commenced to assert themselves about the middle of the fourth week of the disease. The mastoid was found diseased throughout, and in spite of the thoroughness of the operation and the excellent condition of the patient afterward, she died on the seventh day following the operation.

After this experience I became acutely interested in this subject of the prognosis of the mastoid operation in the diabetic, and I soon found a variety of opinions among men of large opportunities for observation. On the one hand, there are those who contend that in any case where there is 3 or more per cent. of sugar in the urine the prognosis is very unfavorable for operation. On the other hand, there are some who do not share the gloomy views of the first mentioned, and they are able to quote a number of cases that have fully recovered from a diseased mastoid after operation. It is easy to understand how there can be differences of opinion due to individual experiences. If perchance an operator should unfortunately meet cases that are far advanced in sepsis it would be expected that his results would be less favorable than those of one who had cases which afforded opportunity for more timely intervention. In my own case I could hardly have suggested an earlier operation,

as the indications for operating did not arise until a day or two before the first consultation. The discharge remained serous for quite a while, becoming purulent only shortly before the appearance of the more serious manifestations. In the beginning of the otitis the patient had marked tenderness over the tip of the mastoid, which disappeared only to return in connection with tenderness over the antrum and emissary vein; rupture of the drumhead occurred spontaneously twenty-four hours before the patient came under my observation. At no time was the temperature per rectum over 101° , until the symptoms became more urgent, when the temperature rose 2 or 3 degrees. A characteristic feature was the marked swelling of the posterior wall of the canal, reducing the fundus considerably and rendering drainage very difficult. The bacteriological examination of the pus showed the prevalence of the pneumococcus.

The literature furnishes, in spite of this experience, a sufficient array of cases to make us feel hopeful when we assume the responsibility of treating these cases of mastoiditis in the diabetic. More than fifteen years ago good results were obtained, and the indications for operating were not then so well developed nor the technique so complete as it is to-day. In the histories of the earlier cases the percentage of sugar is not mentioned. In more recent years, however, there are cases reported where the percentage of sugar is as high as 10 per cent., and in one case jaundice was present. In some cases the operation was done when the indications had been present for some time.

In 1899, Eulenstein of Frankfurt published a paper dealing with the subject of purulent otitis in the diabetic. He was able to report on fifty cases gathered from various sources. The object of the publication was to determine whether there is anything unusual about purulent otitis and its complications in the diabetic subject. In 1903, he published a second paper with the report of twenty

additional cases, making seventy cases altogether. For the purposes of my subject I am not able to utilize much of this material, as in some cases no mention is made of the percentage of sugar, and in others the percentage is under 2 per cent. However, there are a number of cases among these seventy and others to be mentioned later which ended favorably although the outlook was not encouraging. The following are some of the cases of recovery where there was a very high percentage of sugar:

O. Wolf of Frankfurt, in 1887, reported a case of acute purulent otitis with marked symptoms of mastoid involvement, with 7 per cent. of sugar, in which recovery took place without an operation. The patient was put on a very strict anti-diabetic diet, so that the excretion of sugar was lowered to 2 per cent. This case is cited incidentally, to show a recovery without an operation, in the presence of a high percentage of sugar.

In 1885 Schwabach reported a case from the year 1876, of a man 43 years of age who had 4 to 5 per cent. of sugar and a purulent otitis of six weeks duration that was successfully operated; in addition to extensive caries there was facial paralysis, which gradually improved. The patient died a year and a half after the operation, from gangrene of the lower extremities.

Moos reported a case in 1888 of a man fifty-five years old with an otitis of five months. The sugar was a little under 3 per cent. and there was marked swelling over the mastoid. A Wilde's incision was followed by a free flow of pus and a hemorrhage that lasted for three-quarters of an hour despite continuous digital compression. This patient made a good recovery with a cure of his otitis. (Possibly the lateral sinus was opened.)

In 1889, Kuhn of Strasburg reported a case of a woman fifty years of age with 5 per cent. sugar at the first examination, which was reduced by diet to $3\frac{1}{2}$ per cent. This patient had a discharge from the right ear for twenty

years. In the left ear a more recent process had developed. While under Kuhn's observation, both ears showed symptoms of mastoid involvement. The pus showed a mixed infection of streptococcus and staphylococcus. After two months of treatment a Wilde's incision was made on both sides but no attempt was made to go into the bone. This patient also made a good recovery.

In 1897 Koerner reported a case of a man forty-seven years of age where there was 5 per cent. of sugar. This was reduced to 4 per cent. One and a half hours after operation on the patient's mastoid the specific gravity of the urine was 1.034, and 2.8 per cent. of sugar. The patient made a good recovery. This case is the first one reported where an examination was made not only for sugar but for acetone, diacetic acid, and beta oxybutyric acid, according to the advice of Külz.

Dr. Buck's report of two cases of recovery from operations on the mastoid would be of greater value if the percentage of sugar were given. In one case—a man of forty-nine—the urine was stated to be loaded with sugar; the other case was a man of sixty-two, rather infirm in his appearance and gait, who successfully withstood an operation on both mastoids.

In 1892 Koerner reported a case of a man sixty years of age who had a large percentage of sugar, but did not state the amount. This patient died in diabetic coma, six months after a successful operation on his mastoid.

In 1898 Muck operated with success on a case with 2 per cent. of sugar, and catarrhal jaundice.

Friedrich of Kiel in reporting cases of otitis in connection with diabetes, mentions the case of a woman forty-six years of age with 2 per cent. of sugar, who died 6 days after a radical operation. A second case, a man of forty-two, a drinker with albuminaria, 5 per cent. of sugar, and a weak and irregular heart, was operated on in a limited manner with the result of removing the urgent

symptoms, although three months after the closure of the mastoid wound the ear was still discharging.

Barth, in 1901, treated a man of sixty-four who the year previous had a double iritis without known cause. This patient had 4 per cent. of sugar, which was reduced by a very strict diet to $2\frac{1}{2}$ per cent. After five months' treatment a radical operation was necessary which proved successful. Barth reproached himself for not having operated four weeks after the onset of the disease.

Witte and Stürm, assistants to Koerner, reported in 1901 the case of a very corpulent man, sixty-three years of age. He had 4 per cent. of sugar the day before his mastoid was opened and an extra-dural abscess exposed. The wound in this case was closed in twenty-one days.

Stürm and Suckstoff in 1902 had a case, also at Koerner's clinic, where there was $11\frac{1}{2}$ per cent. of sugar. The operation was done under chloroform narcosis and the wound was closed in 33 days.

Eulenstein furnishes two cases in 1902, of mastoiditis successfully operated upon. In the first case the amount of sugar ranged from $3\frac{1}{2}$ per cent. to $\frac{1}{2}$ per cent.; and in the other the range was from $4\frac{1}{2}$ per cent. to $\frac{1}{2}$ per cent.

L. Wolf, also in 1902, gives the history of a woman of fifty years with 3 to 5 per cent. of sugar, and a purulent otitis with marked tenderness over the mastoid, who fully recovered without an operation.

F. Grossmann of Berlin, in a contribution to the *Festschrift* of Prof. Lucae in 1905, furnishes the histories of ten cases of otitis in diabetics. Of these, two were cases of special interest for our purpose. One was a man of sixty-eight who had 3 per cent. of sugar and was under observation one day only, but on account of the urgency of the symptoms his mastoid was opened without delay. He made a good recovery. The other case was a woman, fifty-four years of age, with $2\frac{1}{2}$ per cent. of sugar, who was operated upon three days after being first seen. Two days

after the operation active delirium manifested itself for one day, but a good recovery followed.

McCuen Smith of Philadelphia published this year the history of a case with 4 to 10 per cent. of sugar, where there was extensive destruction of the mastoid cells, and a gravity abscess (Bezold's form). This patient made an uninterrupted recovery. He died a year afterward of oedema of the larynx.

I think for all practical purposes a sufficient number of cases has been cited from various reliable sources to show that we can approach our diabetic cases in a hopeful spirit—even when there is a high degree of glycosuria. We certainly have bad results in non-diabetic cases, and the presence of sugar in the blood is certainly of no advantage, when it is recognized that the diabetic resistance to infection is very much diminished.

I have been compelled to omit many interesting points in the cases reported, two of these being the cases of severe otitis in diabetics which recovered without surgical intervention. We should not, however, place too much dependence upon this possibility. If general narcosis is such a serious factor in the prognosis, we can resort to cocaine infiltration in these cases, as the bone is frequently very much softened and broken down, rendering the operation comparatively easy. If it is absolutely necessary to resort to general narcosis, we must operate rapidly in order to obviate a long anæsthesia, and be content with a less thorough operation than is usual.

Some of the German otologists, on the advice of Naunyn, recommend the giving of large and frequent doses of bicarbonate of soda before and after the operation, so as to lessen the danger from acidosis.

As to preliminary dieting, we do not always have time to resort to this, because of the urgency of the symptoms, but where it is possible we should lessen the amount of free sugar in the blood, as shown by the urinary examination.

It is difficult to generalize, as each case affords its own peculiarities. Unfortunate results may follow where there is a low percentage of sugar, and success may attend cases where there is a high percentage of sugar, even combined with the presence of acetone and diacetic acid in the urine, which latter is always regarded as the precursor of coma. With our constantly improving laboratory methods we ought to know much more about the general as well as the local condition of our patients than in the past, thus rendering possible a more intelligent prognosis for the mastoid operation in the diabetic.

Friedrich, in his book on *Rhinology, Laryngology, and Otology, and their Significance in General Medicine*, says that a high percentage of sugar is an absolute contra-indication for operation, as it increases the danger of post-operative diabetic coma, and is followed by a rise in the percentage of sugar, which he thinks is the direct result of chloroform narcosis.

Koerner, however, does not believe that the anæsthetic is the cause of hastening the coma after the operation, as coma has also come on after an operation where local anæsthesia has been employed. Koerner advises that the patients be operated on in the early part of the morning after the physiological fast, as diabetics do not well bear deprivation from food and drink for any length of time. This refers to cases when general narcosis is employed.

Therefore, in view of the tendency in any diabetic for acute purulent inflammation of the middle ear to assume a destructive course in the mastoid, we should advise that the mastoid be opened when it is observed that there is no decided lessening of the secretion of pus within a few days, even in the absence of other classical symptoms. To be timid in advising an operation on account of the diabetes is in my judgment a mistake; for this timidity postpones an operation until the chances of success are diminished. If we wait until the patient has a high

leucocytosis with a great increase of the polynuclear cells, or any other marked symptoms, or delay because there is no decided diacetic reaction in the urine, we court danger. If we face a combination of serious symptoms when we first see a case, the patient should be given the opportunity of an operation at once, as otherwise there would be only one probable outcome.

There is every reason to believe that with the accumulation of experience on this subject the future will develop constantly improving results of operations on the mastoids of diabetics even with the presence of a high percentage of sugar in the urine.

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THE PRESENT STATUS OF THE QUESTION OF PROGRESSIVE SPONGIFICATION OF THE LABYRINTHINE CAPSULE (OTO-SCLEROSIS).¹

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THE nomenclature of the disease process which we are about to consider is not satisfactory. The term "oto-sclerosis," introduced by von Tröltsch, is, in the light of more recent investigations, misleading, because the pathological process which it is now meant to express is not one of sclerosis at all; quite the opposite, it is a spongying process, of which "rarefaction" is but a poor translation. Again, "spongification (or rarefaction) of the labyrinthine capsule," while expressive of an important portion of the condition, does not take cognizance of a most important factor, namely, the fixation of the stapes in the fenestra vestibulum. "Progressive deafness" is not suitable for all cases, for in not a few the process causing the hardness of hearing ceases entirely, or is so slowly progressive as to be scarcely noticeable; more will be said on this point later on when considering prognosis. Such terms as "otitis media catarrhalis sicca," "dry middle-ear catarrh," "otitis media imperplastica" (de Rossi), are no longer tenable in this connection, as we have here to do with a pathological process which primarily attacks the dense bone forming the bony labyrinthine capsule and that about the fenestra ovalis. Nor may we use an eponym to express the disease, as our

¹ Read before Section on Otology, N. Y. Academy of Medicine, Jan. 10, 1907.

knowledge of it has been the result of not one man's labor, but of many.

The development of our knowledge of the disease may be historically divided into three phases. The first phase began with the recognition of stapes ankylosis as a cause of deafness. The second stage was inaugurated by the discovery that the disease is a primary circumscribed process in the bony labyrinthine capsule, dissociated from demonstrable changes within the tympanic cavity. The third stage is that in which occurred further development in its micro-pathology and the formulation of diagnostic methods.

That deafness may result from fixation of the stapes in the fenestra ovalis was recognized by Valsalva in his *Tractus de aure humana* (Cap. 11, x, p. 24, 1724); by Morgagni in his work *De sedibus et causis morborum* (Lib. 1, Epist. xiv, Art. 11, 1761); and by Meckel in his inaugural dissertation, 1777. From this time to the middle of the last century no further development occurred. In 1849, Toynbee, in the *Medico-Chirurgical Transactions*, vols. 32 and 38, and in 1857, in his Descriptive Catalogue, published his pathologico-anatomical researches in diseases of the ear, based on 1149 preparations. Among these he found 126 specimens of ankylosis of the stapes. The value of these specimens was greatly reduced by the fact that they were accompanied by very scant clinical observations, but the publication gave a fresh impetus to the subject, and in the following thirty years the subject was enriched by the appearance of much research work by von Erhard, Kramer, Voltolini, von Tröltsch, Politzer, and many others. Those who desire a full account of the historical development of this stage I would refer to Panse's book, *Die Schwerhörigkeit durch Starrheit der Paukenfenster*. The net result of all this work was not great. It definitely settled the various forms of ankylosis and the changes occurring secondarily thereto. The fixation was regarded as a direct result of

acute or chronic catarrhal or suppurative processes in the middle ear, of "sclerotic (dry)" catarrh or of circumscribed periostitis. The tardy development of knowledge of this disease was due to two factors: (1) The difficulty of obtaining post-mortem material that had been sufficiently observed during life; (2) the lack of correct diagnostic measures. As you well know, the process which causes synostosis of the stapes is a harmless disease as regards life. The temporal bones of those so afflicted can be obtained only when death results from some intercurrent disease or from violence. Regarding the second point, it is sufficient to mention that as late as 1870 Schwartze believed that the only certain means of ascertaining the fixation of the stapes was by directly testing its mobility with a probe introduced through an artificial opening made in the tympanic membrane.

The second stage dates from 1861, when Moos published the results of his examination of a case in which he found stapes ankylosis *without demonstrable change in the tympanic mucosa*. He ascribed as cause of the ankylosis a primary otitic process occurring in the bone itself. In a second case he ascribed the ankylosis to a circumscribed periostitis occurring in the labyrinthine capsule. This publication was quickly followed by others, all agreeing in the main as to the pathological findings, but differing as to the exact histological origin of the process, that is, as to whether the pathological change originated in periosteum, bone, or cartilage.

The third phase in the history of the development of our knowledge of the disease began with Bezold, who, in 1885, before the *Versammlung Süddeutscher Ohrenärzte*, in München, reported the first case of stapes ankylosis, in which the correctness of the clinical diagnosis was verified by the results of a microscopic post-mortem examination and manometric tests of stapes mobility; while he, at the same time, laid the foundation of functional tests as aids to diagnosis of the condition.

Soon after this the microscopic examination of specimens of the temporal bone added greatly to the advancement of the subject. Politzer was the first to illustrate the microscopic findings of stapes ankylosis in his textbook published in 1887. To L. Katz belongs the honor of publishing the first case in which stapes fixation was diagnosed during life by the results of functional tests, and which was microscopically examined after death. Katz's second case can hardly be admitted as evidence. The temporals, which were examined, had been taken from a heterogeneous collection contained in a jar in the Insane Asylum. They were unaccompanied by any history whatever. They show merely osteoporotic changes not only in the petrous portion, but in the malleus and incus. And the process with which we have to do in spongification (oto-sclerosis) is not identical with osteoporosis. This latter is a senile process and is characterized by resorption (of the most minute kind) without any particular apposition of new tissue.

Since Katz's publication in 1890, there have been less than forty cases reported, in which the diagnosis made during life has been confirmed by section. While this series may not be considered large, yet enough positive knowledge has been derived therefrom to warrant us in regarding many important features of the disease as established, though some points, as regards its nature, etiology, and pathology, remain under discussion. Among the latter is the question as to whether the changes occurring about the foot-plate of the stapes and in the bony labyrinthine capsule are primary or secondary to disease of the middle ear. By far the greater mass of evidence tends to prove the *primary* involvement of the foot-plate of the stapes and the region surrounding it in the fenestra ovalis and the bony labyrinthine capsule. While the cases reported by Scheibe and Habermann, besides the changes in the dense bone of the capsule and in the fenestra ovalis, showed evidences of a previous

middle-ear suppuration, or changes in the tympanic membrane, the greatest number of examinations by observers like Siebenmann and Bezold, *showed no changes whatever in the middle ear*. Further, isolated islands of spongification in the region of the internal auditory canal and in the cochlea have been observed by Politzer, Siebenmann, which have had no connection whatever with the middle ear,—have been separated therefrom by normal bone. It would seem, therefore, that we are justified in regarding the disease as one which primarily affects the region about the foot-plate of the stapes and the bony labyrinthine capsule, independently of suppuration or catarrhal middle-ear disease, and in believing that the changes which have been found in the middle ear are adventitious, or complicating manifestations, or entirely different pathological processes. With these preliminary remarks we may define oto-sclerosis as a disease of the auditory apparatus, which is manifested clinically by loss of hearing, unaccompanied by change in the tube or tympanic membrane, by certain characteristic reactions to functional tests; and, pathologically, by an early loss of mobility of the stapes by osseous ankylosis between it and the fenestra ovalis and by resorption of the normal and reposition of altered osseous tissue in the bony labyrinthine capsule which reduces its density.

PATHOLOGY.

The principal factors of interest in the pathology of progressive spongification are grouped about the changes which occur about the foot-plate of the stapes and those in the bony walls of the labyrinthine capsule—the cochlea, semicircular canals, and vestibulum. And in order to refresh memory you are invited to participate in a brief description.

The stapedio-vestibular articulation is not a true joint, but rather a symphysis. The bone on both the stapedial

and fenestral sides is covered with a delicate layer of cartilage to which is attached the annular ligament, binding the two together at all points. As all bone is primarily laid down in tissue closely akin to that composing connective tissue and ligamentous structures, it may easily be imagined—and, in fact, it does occur—that osseous transformation (metaplasia) within these structures takes place readily under favorable conditions. Again, if we examine the stapedio-vestibular symphysis, the relatively greater length of the annular ligament at its anterior portion in comparison to that of the posterior portion will prove the greater mobility of the former portion of the symphysis. The stapedus muscle, contracting, fixes, to a relative degree, the posterior edge of the foot-plate of the stapes in the fenestra ovalis. It is the anterior portion of the foot-plate, therefore, that in the auditory function responds to the greatest vibratory amplitudes. It must be admitted as a corollary that in this region the greatest amount of friction or irritation occurs. And it is a suggestive fact of greater significance than a mere coincidence that this region is the point of predilection for the occurrence of those pathological changes which result in osseous ankylosis.

It is valuable in our clinical work to keep in mind that fixation of the stapes may occur in conditions other than spongification. These may be grouped under three heads. In one group occur those cases in which the mobility of the stapes is more or less decreased by thickening of the mucosa or the periosteum, or by strands of organized inflammatory material, or adhesions within or about the pelvis of the fenestra ovalis and stapes, which have their origin in simple acute or chronic inflammatory processes. In such cases deposits of chalk may be laid down in this inflammatory nidus, thus decreasing still more the mobility of the stapes. This form is the ankylosis spuria membranacea of Erhard, and is easily differentiated by the presence of catarrhal

factors in the nose and post-nasal space, in the tube, and by the characteristic otoscopic picture presented by the tympanic membrane, and by the increase of audition after inflation, if the stapes retains any mobility.

A second form is that known as temporary fixation of the stapes, which occurs in closure of the Eustachian tube, with a high degree of retraction of the membrana tympani. This condition is differentiated by the Gellé test, and by the restitution of stapes mobility coincident with the disappearance of the closure of the tube and retraction of the tympanic membrane. The other form is the one now under consideration, and occurs as a part of the spongifying process of the labyrinthine capsule.

As to the origin of the spongifying process, little is certainly known. Whether the process originates in the perichondrium or in the bone itself in the periosteum is unsettled. Bezold leaves the question open. Politzer believes that it originates in the bone itself; while Siebenmann, who has gone deeper into the histology of the process than, perhaps, any other, advances an original explanation of its origin and etiology. He regards it as "the final stage of a developmental process which does not normally take place in the petrous bone, but which is the rule with other bones." The normal labyrinthine capsule remains throughout life unusually rich in remnants of primary cartilage. The remnants are found most frequently at the very point of predilection for the spongifying process. In all the long and flat bones of the skeleton there is a continuous loss and regeneration after birth, so that the bone continues to increase in size without changing its external shape. In the labyrinthine capsule, however, we have an exception, as its ultimate size is attained at birth, and later decrease or increase takes place only within slight limits. He regards this as the reason why so many cartilage remnants are retained in the labyrinthine capsule to an old age.

The changes which take place in the labyrinthine

capsule and in the stapes may be regarded as a process of resorption of old, and apposition of new, metamorphosed tissue. Between the unchanged bone and the adjacent new bone Pommer's cement line at first may be seen, but this gradually disappears as the process advances. The first discernible change at the beginning of the process is that the walls of the Haversian canals lose their tinctorial affinity for hematoxylin and carmin. They then become enlarged in consequence of the resorption of their walls. The co-operation of multinuclear osteoclasts may occasionally be observed, but not always. While this process of resorption is progressing, the apposition of new osteoid tissue is observed at its confines. Broad, flat osteoblasts form a peripheral zone to the decalcified, osteoid tissue, which stains intensely red with carmin. This osteoid zone is still further differentiated from the neighboring bone by a loss of clarity and by innumerable heterogeneous, large, thick bone cells, which contain one or more nuclei. All the cartilaginous remnants in the interglobular spaces are resorbed and replaced by this osseous mass. The cartilage of the foot-plate and that of the fenestra become highly vascularized by the formation of new blood-vessels, are resorbed, and in the end are replaced by spongiosa. The newly-formed bone gradually assumes a lamellar formation; the medullary spaces become less rich in cells and blood-vessels, while the connective tissue becomes more abundant. The changes about the foot-plate of the stapes are varied. Occasionally it and the annular ligament are amalgamated into one solid mass, with the fenestra ovalis. In other cases single delicate bridges of osteoid tissue connect the foot-plate with the fenestra. Or the bridge may be incomplete, so that a true ankylosis is not consummated. The distribution of this osteoid tissue in the cochlear walls and semicircular canals occurs without any relation to its occurrence about the foot-plate. Isolated foci have been observed in the region of the porus acusticus,

in the semicircular canals, as well as in the vestibular walls, entirely separated from the stapes. The same process may occur around the round window until its obliteration is more or less complete. The spread of the process tends always towards the endosteum, so that the labyrinthine fluid may be separated from the enormous lymph spaces of the newly formed spongiosa only by a very delicate membranous partition.

As the labyrinthine capsule of all the higher animals is composed of markedly compact bone, we are justified in assuming that this quality of density is essential to normal hearing. The separation of the two lymph systems—that of the perivascular lymph spaces of the Haversian canals and of the labyrinthine lymph—is essential to the same function, as witness the care with which nature has almost completely separated the vascular supply of the endosteum and that of the surrounding bone. "The blood-vessels of the endosteum communicate in only a few places through narrow capillaries with the blood current of the bone. . . . The lymph circulating in the Haversian canals is shut off from the labyrinthine lymph" (Siebenmann). The great importance of these facts will be brought out further when treating of functional reaction.

ETIOLOGY.

The cause of oto-sclerosis is still to be found. Gradenigo's researches on its bacteriology resulted negatively.

Sex.—It is a disease which affects women more frequently than men. According to Bezold's statistics, in general ear diseases, 58 per cent. were in males, and 42 per cent. in females; while of those suffering from oto-sclerosis 61.2 per cent. were females. Denker gives 58.2 per cent. females and 41.87 per cent. males. Hartmann's statistics based on 33 cases in which stapes ankylosis was proven by post-mortem examination bear out the other

figures. Of the 33 cases, 18 were females and 15 males. My own statistics, based on cases accurately observed in private practice and in the Illinois Eye and Ear Infirmary, give not quite 60 per cent. females. Other observers (Panse, Walb, etc.) agree in the predominance of the female sex. The changes occurring in the skeleton, the anæmia, the anomalies of nutrition which are peculiar to the puerperium, suggest a connection between the two conditions. Indeed, in not a few instances patients have distinctly dated their aural symptoms from the occurrence of a pregnancy. That in 88.8 per cent. (Bezold) both ears are affected would speak for its cause being constitutional and not local. Out of 306 cases, Denker elicited a history of heredity in 40.5 per cent., Bezold 52 per cent., Siebenmann in 35 per cent. That heredity bears a direct relationship to the disease is now conclusively proven by Koerner's case in which from marriage of two individuals affected with spongification twelve children were born, all of whom were afflicted with the disease without exception. In my own cases 71 per cent. gave a history of heredity. The transmission seems to have a tendency to take place through the female branches. Harmful embryonal influences are more apt to affect the female than the male.

Oto-sclerosis is a disease of middle age. It rarely begins before the twentieth year, though its occurrence before that age is not unknown. In not a few cases a history of exposure to severe cold inaugurates the train of symptoms, which resulted in speedy deafness. Overheating of the body, accompanied by exhausting exertion, was followed in one case, a young lady, who has been brought to my attention, by total deafness.

Habermann is a strong supporter of the theory that syphilis is the causal factor in oto-sclerosis. He points out the coincidence of the time of life at which labyrinthine rarefaction begins and that in which luetic infection is most frequently acquired; and that there is a similarity

between the histological changes found in labyrinthine rarefaction and syphilitic and parasyphilitic osteitis. The long duration, the subsequence of active foci, the formation of spongy hyperostosis and exostosis, the resorption of old bone and reposition of new, as found in labyrinthine rarefaction, have their analogues in syphilitic osteitis. He explains the absence of caries and necrosis in labyrinthine rarefaction by ascribing to the virus diminished virulence, and calls to his support the observations of Volkmann and Saloweitschik, that even osseous gumma undergoes necrosis only under unfavorable conditions. He also brings to his support clinical observations in which a certain number of cases gave evidence of syphilitic infection. That there are many more cases of syphilis which have involvement of the internal auditory apparatus in the secondary stage than is generally supposed, I believe, yet I would not accept at the present time the theory that lues, acquired or hereditary, is the etiological factor in all cases of labyrinthine rarefaction. Against such a belief is the fact that although more men than women are afflicted with syphilis, the reverse is true of oto-sclerosis. Further, oto-sclerosis bears no cogent relationship to the wide dissemination of syphilis.

FUNCTIONAL TESTS AND DIAGNOSIS.

The diagnosis of pure, uncomplicated oto-sclerosis is not difficult. Given a case with increasing hardness of hearing, a tympanic membrane that is normal, or nearly so, a normal Eustachian tube, and in which the Bezold triad is elicited, the diagnosis is clear. Bezold's triad consists of (1) prolonged bone conduction, (2) a markedly negative Rinne, and (3) the elevation of the lower tone limit. In all cases in which the diagnosis of stapes ankylosis has been made *intra vitam* on this symptom-complex, and which have been examined *post-mortem*,

the diagnosis has been confirmed without exception. The analysis of these tests would lead us into theoretical discussion of too great length. We will, therefore, pass on to the consideration of a form of rarefaction of the labyrinthine capsule which gives other reactions, and the differentiation of nerve degeneration.

There is strong reason, based on post-mortem evidence to believe that certain functional reactions vary in direct ratio as to whether the disease process preponderates around the vestibular window or along the walls of the cochlea. The two elements oppose each other—that is to say, increase in stapes ankylosis lengthens bone conduction and causes the Rinne test to become more markedly negative. On the other hand, preponderance of the rarefying process in the labyrinthine capsule tends to shorten Schwabach and decrease the negativeness of Rinne. As it happens that the regio predilectionis is situated at the upper and anterior portion of the vestibular window, stapes ankylosis most frequently predominates, but there are cases on record in which the reverse is true. The ankylosis was incomplete, the labyrinthine capsule was greatly affected. In these cases the bone conduction was reduced or negative, and the Rinne negative shortened. No nerve involvement was found on post-mortem examination to account for the decreased bone conduction.

In addition to the fact that in all the higher animals, as has already been mentioned, the labyrinthine capsule is composed of very dense structure, Siebenmann adduces from the association of marked loss of aërial and osseous audition in those cases with spongification of the bony capsule *without* nerve involvement, and the absence of or incomplete ankylosis of the stapes, that compactness of the capsule is essential to normal hearing. Not only is the physical quality of density changed in labyrinthine rarefaction, but, as the process progresses, the perilymphatic spaces of the Haversian canals, increasing in

number and size, approach the labyrinthine cavities, so that the perivascular lymph spaces and the perilymph are at last separated only by the most delicate connective-tissue septa. These changes in relation between the peripheral lymph system and the perilymph must produce changes in the pressure condition and density of the latter. As changes produced by diffusion of liquids cannot be excluded, chemical alteration in the perilymph may contribute to the loss of function of Corti's organ. Not only may the two lymph systems be separated by only a delicate membranous partition, but this partition may be absorbed. Under these circumstances perforations occur, so that the two lymph systems are in actual uninterrupted communication. In this way are explained those attacks of sudden loss of hearing and decreased bone conduction, pistol-shot-like sounds, etc., occurring in the course of oto-sclerosis, in which hearing slowly, incompletely, or never returns to its previous condition. In all cases of oto-sclerosis the labyrinthine capsule, aside from the changes about the stapes, is always affected, and, according to Siebenmann, from whom I have so extensively quoted, always tends to modify results of tests for aërial and osseous conduction. When we compare the degree of prolongation of bone conduction in the cases reported by Bezold, for instance, in which complete stapes anchylosis was proven post-mortem, with the prolongation of osseous conduction when stapes fixation is produced artificially, or in cases of complete closure of the Eustachian tube, with extreme retraction of the drum-head in young individuals, we find that in the latter instances there is a relatively greater increase of osseous conduction as well as greater aërial auditory power. It is a good working principle to remember that the changes occurring in the labyrinthine capsule of the cochlea, apart from stapes anchylosis, tend to decrease audition, both aërial and osseous, while those occurring about the foot-plate of the stapes, which

result in a greater or less degree of fixation, tend to increase bone conduction and decrease aërial, especially for low sounds. As one or the other pathological element predominates, the results of functional tests, especially those for osseous conduction, will vary.

In cases of oto-sclerosis, with decreased bone conduction, we have four tests with which we may in the large majority of cases differentiate nerve deafness. First, loss of the lower tone limit. Second, retention (comparative) of the upper tone limit. Third, increasing aërial auditory duration as the vibratory oscillations increase numerically. Fourth, Gellé test.

The loss of the lower tone limit is, perhaps, the most constant symptom in oto-sclerosis. If this symptom is present, even in those cases with marked loss of the upper tones, shortened Rinne, and an inversion of duration of the ascending scale, we are justified in suspecting, together with nerve degeneration, the existence of rarefaction, except in those cases of congenital deafness or those which result from acute labyrinthitis, or in cases of fracture of the base of the skull.

There is rarely much loss of the upper tone limit in uncomplicated labyrinthine spongification — probably never below the fourth degree of Edelman's Galton pipe. As the high limit descends below this point, or as islands of defect in the high scale develop, nerve involvement becomes more likely, as is occasionally the case in advanced types of spongification.

The third reaction in our list was inaugurated by A. Hartmann, who found that in oto-sclerosis the aërial conduction increased in duration as the number of vibrations increased. For this purpose it suffices to employ the octaves from C to c⁴. In nerve degeneration this reaction is reversed: duration of aërial conduction diminishes as the scale is ascended.

The value of the Gellé test is variously estimated by otologists. I have used it for a number of years, and find

that it is of great service in controlling Rinne test, especially in cases of oto-sclerosis. I agree in the main with Gellé's deductions:

1. A negative Rinne combined with a negative Gellé permits the exclusion of nerve involvement.
2. A positive Rinne and a positive Gellé indicate nerve deafness.
3. A positive Rinne and a negative Gellé are strong presumptive evidence of stapes fixation and nerve involvement.

To recapitulate the points in diagnosis:

1. The patient is examined with the otoscope and the hearing distance for whisper ascertained. In case the otoscopic examination discloses evidence of an inflammatory process in the tube or cavum, catheterization is at once performed and the hearing distance again taken. In case this is not characteristically increased, we proceed as in cases with normal tube, with

2. Testing for the lower tone limit. Frequently we find in cases in which hearing for whisper is not markedly affected, and yet the lower tone limit is elevated to 36 d.v. As the hardness of hearing increases, the hearing for lower tones diminishes, so that in a case in which the voice may still be perceived at very close range, the lower tone limit is found to be g^1 . When the patient perceives a lower tone than 32 d.v., we must search elsewhere than fixation of the stapes for the hardness of hearing (Bezold).

3. Then we test the osteo-tympanal conduction for low tones, using fork A. In uncomplicated cases where there is stapes-anchylosis Schwabach is invariably prolonged over the normal.

4. We then may proceed with Rinne's test with higher forks (a^1 , a^2). In the majority of cases the bone conduction is found to be prolonged, but occasionally it is decreased from the normal, but on placing the fork opposite the concha it is no longer heard. In other

words, the bone conduction is either equal to or greater than the aërial conduction. It is well to measure in seconds the osseous and aërial conduction, and to this end a split-second stop watch serves a valuable purpose. When these reactions are elicited in a case of hardness of hearing in which no inflammatory action is present, as is shown by auscultation of the tube and otoscopy, the diagnosis of spongification of the labyrinthine capsule with ankylosis of the stapes is complete. If in cases in which inflammatory processes are present in the tube and cavum the same reactions are elicited, we should not be deceived into a false optimism, but our prognosis should be most guarded, notwithstanding the slight improvement in hearing for the voice, which may follow inflation. The reactions prove stapes immobility, and whether this is due to spongification or is temporary (or permanent), and due to simple inflammatory processes in the pelvis of the oval window must be determined by successive observations.

And this leads us to the prognosis. There are two classes of cases to which we must give the worst prognosis, both as to rapidity of course and extreme loss of hearing, namely, those in which the umbo has the peach-blow color, which is due to the hyperæmia of the first turn of the cochlea showing through the tympanic membrane, and those in which islands of defect occur in the upper tones, *i. e.*, those of the Galton whistle.

Having become acquainted with the nature and seat of the pathological process which we are considering, the futility of those procedures which are so useful in overcoming the inflammatory processes of the tube and cavum becomes at once apparent. Indeed, in a great many cases of progressive spongification they are worse than useless—they are distinctly harmful. Yet we may do much toward re-establishing hope in the minds of those who suffer from this disease by assuring them that the process is very slowly progressive, and that they will

have in all probability serviceable hearing for a long time; that they are not inevitably to be the victims of complete deafness, and that the disease may come permanently to an end at any time. We know too well that there are cases in which the course is rapid, and that there are others in which sudden deafness occurs in cases which have apparently been but slightly affected, but these are of such rare occurrence that we may ignore them, at least as far as our prognosis to the patient is concerned.

We may with propriety assume the same attitude in our prognosis towards the tinnitus and vertigo that occasionally occur in these cases. The assurance that these are not due in any way to brain disease, that they do not portend mental impairment, is often accepted with the greatest satisfaction and relief of mind by the patient. He must be cautioned against allowing the tinnitus to prey upon the mind, he must be encouraged to ignore it as much as possible, with the authoritative statement that it will not become unbearable, and that it may and probably will become less or disappear altogether in the due course of the disease.

Another point which I must touch on is the question as to whether those afflicted with the disease should marry. As I have already said, the puerperal state occasionally serves to initiate the disease or increase the deafness. That it is a disease in which heredity plays a prominent rôle, there can be no doubt. Surely a man and woman who are both the victims of spongification of the labyrinthine capsule should be warned against marriage for the sake of the offspring, but I am not in accord with Koerner's doleful axiom that those in whose families the hereditary tendency toward spongification of the labyrinthine capsule is manifest should be forbidden the marriage state, that their sad inheritance may end in the grave with them.

Treatment.—If the usual conservative means of treating inflammatory disease of the tube and middle ear are

useless in combating the inroads of spongification of the capsule, so are operative procedures: tenotomies, ossiculectomies, myringotomies, etc. I have had ten cases on small doses of phosphorus for two years. These have not changed materially one way or another, as proven by control tests. But the same may be said of other cases that have had no treatment. It is unnecessary to say that if intercurrent attacks of simple inflammation occur they should receive immediate attention. In the plethoric, purgation is followed by benefit, and in the gouty, the administration of iodine preparations is occasionally followed by amelioration of the tinnitus and increase in hearing.

All who are afflicted with spongification should be cautioned against over-exertion, mental or physical. Overheating and chilling of the body have been frequently followed by marked exacerbation and complete and permanent deafness. But let us bear in mind the fact that we have at the present time no remedy *per se* against the disease, spongification of the labyrinthine capsule. What laurels await him who first shall find the golden key that shall unlock these deaf ears!

In conclusion, I wish to acknowledge my indebtedness in the working out of this paper to the brochures of Panse, Stern, and Denker.

OUR FAULTY METHODS OF BRAIN LOCALIZATION IN INTRACRANIAL LESIONS COMPLICATING AURAL DISEASES.¹

BY S. MACCUEN SMITH, M.D., PHILADELPHIA, PA.

IT is not my intention to treat the subject of intracranial complications in an exhaustive manner, but merely to bring it to your notice, with the hope that the discussion which follows will establish some points in differential diagnosis of brain lesions complicating aural disease.

In determining the presence and location of a brain tumor, where the patient's life is in no immediate danger, distinct localizing symptoms can be waited for, and a definite diagnosis can be deferred; but in a case of intracranial suppuration, in which a life may be saved by immediate action, or sacrificed by delay, we have an altogether different problem confronting us.

This extremely difficult question resolves itself into two parts:

First: Whether or not a cerebral abscess is present.

Second: What is its location?

A critical analysis of the manifold symptoms will usually enable us definitely to determine the former, but an accurate, unqualified answer to the latter is still extremely difficult and in most instances impossible of precise interpretation. Each succeeding generation has

¹ Read before the Section on Otology of the Academy of Medicine, in New York, Feb. 8, 1907.

produced its investigators, profoundly learned and skilled in the dissecting room and at the autopsy, and yet, as Prof. Keen has pointed out, "fifteen years of experimentation (vivisection) have taught us more than the previous fifteen hundred years of careful observation and post-mortem examinations."

We must respectfully defer to those best qualified to determine the value of continued vivisection, in its relation to additional knowledge in *exact* brain localization. Judging, however, from the remarkable progress made in the recent past by those pursuing these scientific and humane investigations, it does not seem unreasonable to predict that the profession, in the near future, will be in possession of knowledge, the proper utilization of which will be the means of saving hundreds of valuable human lives that to-day are being sacrificed unnecessarily,—the anti-vivisectionists to the contrary, notwithstanding. Only with such knowledge at our command will we be able to emulate the brilliant achievements accorded localization through the motor area.

We feel that we know something of the area presiding over sight, but much less of general sensation, hearing, smell, and taste, while that controlling the intellect is still almost wholly in the dark. The establishment of invaluable comprehensive facts regarding the motor area was made possible only by scientific experimentation, mostly on the lower animals. As conclusive proof that the results thus obtained have more than justified the methods employed, I have only to remind you of the brilliant achievements of the latter-day surgeon and his co-workers in motor localization and all that appertains thereto.

In uncomplicated cases our methods of localization are fairly accurate and can be relied upon in the majority of instances. Unfortunately, however, most of the patients coming under our observation present symptoms so complex, and therefore so unreliable and confusing, that we

are often greatly perplexed in our efforts to accurately locate the intracranial lesion, and finally are compelled to arrive at a diagnosis by the process of exclusion, which frequently means little more than guesswork. This procedure, to say the least, is unscientific and in some respects reprehensible and unbecoming a learned profession.

It may be justly claimed that by personal intuition or some other occult power of reasoning, our success in locating and evacuating intracranial abscess formations so largely predominates that criticism of our failures, in view of recent advances made in this direction, is unfair. At the same time, in a patient presenting the symptom-complex, and these are the cases usually met with, we may select a point for operation without tangible, or at least convincing, proof of a correct diagnosis. The exigency of circumstances naturally impels such action, and largely justifies this "hit-or-miss" practice, inasmuch as prompt evacuation of the pus offers the only possible means of relief. Other things being equal, the writer would select the temporo-sphenoidal region for operation, from the fact that he believes this locality most frequently involved, whereas another surgeon, for similar reasons, would select the cerebellum. It is possible, but unlikely, that both regions may be implicated. Should we fail to find pus in the locality primarily selected, it then becomes our duty to explore another, thus subjecting the patient to the shock and danger incident to two or more operations on the delicate structure of the brain. It is indeed true that under modern surgical practice and aseptic precautions, the brain will tolerate almost unlimited exploratory measures. Nevertheless, we must remember that each minute particle probably has its own special function, and physiologically is so arranged that the functional harmony is unbalanced in direct proportion to the molecular disturbance, as well as by the locality involved. This is especially noticeable in

the impaired mentality and other abnormal manifestations observed in some patients following operations on the brain.

We all recognize that pressure symptoms are made evident by headache, nausea, and vomiting, vertigo toward the diseased side, mental and physical depression, marked lethargy, convulsions that may be attended with loss of consciousness, probably choked disk or optic neuritis, as well as reduced pulse rate and temperature. In a given case showing the above symptoms, especially when sudden in development and following a period of impaired health, we may be assured of the existence of an intracranial lesion. The point of vital importance is our ability to locate accurately the pus formation, since its prompt evacuation is the only means at our disposal offering relief. It is not sufficient to satisfy ourselves that a given region of the brain is involved, such as the cerebrum or cerebellum, but we should be able to designate definitely and finally the exact location of the lesion, as well as determine the amount of destruction incident thereto.

Brühl points out that in a lesion of the third frontal convolution, on the left side, we find agraphia and alexia; in lesions of the first temporal convolution on the left, word deafness, crossed deafness, and anosmia; of the occipital lobe, optic aphasia and hemiopia. When the lesion is situated around the fissure of Rolando, epileptiform convulsions and crossed paralysis of the extremities and facial paralysis are present. In lesions of the cerebellum, ataxia, vertigo, staggering gait, nystagmus, emaciation and rigidity of the muscles of the neck are manifested. These latter symptoms, taken in connection with the severe occipital pain increased by percussion, the marked vomiting, frequent yawning, and extreme prostration, together with the flexed limbs and upturned face, would seem to be characteristic of cerebellar abscess.

However, I have seen cases operated upon for cere-

bellar abscess, in which no pus was found, notwithstanding the fact that many of the above enumerated symptoms were present. In one case in particular, the post-mortem examination revealed the presence of non-infectious sinus thrombosis, the inflammatory condition extending to the meninges and brain tissue adjacent thereto. In this instance the symptoms showed that the lesion was located in the region of the cerebellum, but the interior of the cerebellar lobe was absolutely normal.

Briefly stated, the symptoms of brain abscess in general are as follows: Pain in the head is the earliest symptom, and at first is very severe, but later it becomes a steady, dull ache, and is present as long as the patient retains consciousness. It is increased if the cranium is percussed or pressure applied. At the beginning the patient has a high temperature, which soon drops to normal or sub-normal, but in case of rupture the absorption of toxin and the removal of pressure cause another sharp rise. When the temperature is highest, the pulse is usually rapid, but later it slows down and remains so until pressure is relieved by rupture of the abscess, when it again becomes rapid. Respirations are slow, deep, and stertorous. There will be cerebral or reflex vomiting, *i. e.*, emesis with a clean tongue, and not dependent on the ingestion of food. In the beginning the only ocular symptoms present will be photophobia, but later the pupil on the affected side becomes dilated and examination of the eyeground shows optic neuritis. Usually in advanced cases of brain abscess the patient is in a state of stupor, being hard to arouse, and only performs acts or answers questions after he has been spoken to several times, if indeed he can be aroused at all.

If the abscess is in the region of the Rolando fissure, certain muscular centres may be pressed upon, and thereby manifest its presence in the form of Jacksonian epilepsy. But cerebral abscesses of otic origin are seldom found in this region. Their location is usually

either in the temporo-sphenoidal lobe or in the cerebellum.

A great majority of these abscesses are found under what Barker calls the "dangerous area." This is within a circle having a radius of $1\frac{1}{4}$ inches, which has for its centre a point $1\frac{1}{4}$ inches above and behind the external auditory meatus. They are often found not directly in contact with their source of infection, but with about an inch of healthy brain tissue intervening,—this, of course, occurring when the infection is carried by the venous system.

It is sometimes noted that the local temperature is higher immediately over the seat of the abscess, even though the body temperature is subnormal. Macewen has found in some cases that in percussion of the head a higher note is elicited over the abscess than over the rest of the head.

A point of the greatest value, and one, furthermore, that explains the fatal termination of many cases that succumb after the pus has been evacuated, is the development of satellic abscess formations, arising from the parent abscess cavity. These foci are usually separated from each other by a thin wall of healthy brain tissue. Here again, accurate localization would enable us to determine definitely the situation of additional metastatic pus areas.

W. Milligan¹ states that the "occurrence of sensory aphasia is a symptom in cases in which a pathologic lesion is situated in the temporo-sphenoidal convolution; of motor aphasia, when the lesion is in the third left frontal convolution, or when pressure, say from an adjoining temporo-sphenoidal abscess, is exerted upon this centre; of twitching paresis or paralysis of various muscles or groups of muscles, when the cortical centre which controls these muscles is interfered with, either as the result of an irritative and spreading meningitis

¹ *British Med. Jour.*, Oct. 22, 1898.

or as the result of the pressure of a gradually increasing focus of suppuration." Hemiplegia signifies that the contents of the abscess press upon the internal capsule. Involvement of the third nerve is a symptom of temporo-sphenoidal abscess; sometimes the sixth nerve is involved in the same lesion. In cerebellar abscess we sometimes find optic neuritis followed by atrophy. An uncomplicated otitic cerebral lesion is not difficult to diagnose, but when one or more lesions occur together, then symptoms of one overlap or mask those of the other.

Gradenigo¹ draws attention to the fact that encephalic abscess consecutive to purulent middle-ear otitides are situated either in the temporo-sphenoidal convolutions or in the lateral lobe of the cerebellum, and in both instances are near the diseased temporal bone. Up to the present time the same description of symptoms has been applied to the two kinds of abscesses. Nevertheless, the pathogenic, anatomic, and therapeutic differences that exist between the two forms of encephalic abscess justify a special description of each. Gradenigo then proceeds to describe the symptom of otitic cerebellar abscess: "Cerebellar abscess is less directly in relation with osseous lesions than cerebral lesions. Infection is conveyed to the cerebellum either by the sigmoid fossa or by the labyrinth through the internal auditory canal. With cerebral abscess there often co-exists sinus thrombosis or lepto-meningitis. Differential diagnosis of these lesions is most difficult. Neither optic neuritis, lateral nystagmus, vertigo, nor rigidity of the nucha is a special symptom of cerebellar abscess."

When blood counts were first made to determine the presence or absence of severe infection, leucocytosis was the all-governing factor, but more careful study, with numerous observations, has shown that a differential count must be made and that leucocytosis is more an

¹ *Ann. des mal. de l'oreille*, Sept., 1898.

index of body resistance to infection than of its severity.

For example, a person with good resistance may have a marked leucocytosis as the result of a slight infection, and, on the other hand, a person with impaired resistance may have little or no increase in the number of white cells with a very severe infection.

The relative number of polynuclear leucocytes is of the greatest significance in the determination of the presence of a purulent or gangrenous process. The normal percentage of these cells varies between 59 per cent. and 68 per cent., with an average of about 61 per cent. If there is a relative count of less than 70 per cent., no pus need be suspected. Pus is not common with less than 80 per cent., except in children, where it has been found with a count as low as 73 per cent. About 93 per cent. indicates a very severe process, and when it reaches 95 per cent. it may be considered almost fatal.

Fowler¹ cites two very interesting cases:

CASE 1. A young woman with serious otitis media had pain, rapid pulse, temperature, etc., indicative of acute mastoid disease, but as the polynuclear cells reached only 59.7 per cent., operative procedure was deferred and the patient recovered without operation.

CASE 2. A young man recovering from mastoid involvement as a result of an acute purulent otitis media, for which he had been operated upon, began to show evidence of meningeal irritation, with only slight inflammation, except that the polynuclear cells were up to 82.3 per cent. Operation disclosed a large abscess, and the patient subsequently died from meningitis. In both of these cases the percentage of polynuclear cells was accepted as an index for or against surgical interference.

From these observations we reach the following conclusions:

First. A marked leucocytosis with a relative per-

¹ *Treatise of Surgery*, p. 255.

centage of polynuclear cells below 70, shows slight infection with good resistance.

Second. A marked leucocytosis with relative percentage of polynuclear cells above 80, shows severe infection with good body resistance.

Third. Slight or absent leucocytosis, with relative percentage of polynuclear cells above 80, shows severe infection with impaired resistance.

An interesting contribution on this subject by McKernon,¹ in which he reviews his findings in one hundred and sixty-six cases, confirms the value of the differential blood counts in septic cases.

I am indebted to Dr. J. Chalmers Da Costa for the following notes:

"That an abscess may cause focal symptoms is undoubtedly true, but in some regions it never does; and in some instances when situated in a region in which one would expect it to, it does not do so. The diagnosis may rest to a very large degree upon a history of injury; the existence of some suppurating condition, particularly about the head or face; or the presence of some bacterial disease. When a person suffering with one of these conditions develops headache, slowed pulse, vomiting, irregular or subnormal temperature, and stupor, there is infection within the cranial cavity, which may be due to meningitis and may be due to abscess. If, in such a condition, there is evidence of localization of a process, the diagnosis of abscess is certain. Hence, focal symptoms should always be sought for, and are of the greatest possible value when found."

Abscess in or near the motor cortex may produce spasms, as a brain tumor does; but Mills points out that spasms are less frequent in abscess than in brain tumor, and even if present, do not have "such definite initial or signal symptoms." Of course the focal symptoms, if

¹ *N. Y. Med. Jour.*, Jan. 19, 1907.

they exist, vary with the situation of the abscess, its size, the regions into which it passes, and its association with purulent meningitis. In ear disease, the abscess is usually found in the temporo-sphenoidal lobe; and in that case it is occasionally found that there is loss of power on the opposite side of the body. This symptom may confuse us, and lead us to believe that an abscess is not in the temporo-sphenoidal lobe. When this condition is met with, it results from "pressure upon the fronto-parietal region, across the Sylvian fossa" (Mills). An abscess in the temporal region of the left side may cause word-deafness or perhaps amnesic aphasia. So, too, the third nerve on the side of the abscess may occasionally exhibit the effects of pressure.

It is difficult, or impossible, to locate from symptoms the existence of an abscess in the frontal lobe. Abscess of the cerebellum may present definite cerebellar symptoms, and may induce focal symptoms; and it can readily be confused with tumor. If we are in doubt, and suppurative ear-disease exists, the chance is in favor of abscess rather than of tumor; but if there has been an injury of the head, the chance is probably more in favor of tumor than of abscess. The symptoms of tumor are more gradual in onset, and there is the absence of the temperature to indicate some suppurative process, which in cerebellar abscess is apt to be elevated in the beginning of the case and subsequently become normal or subnormal. Again, in tumor choke disk is much more frequent than it is in abscess.

I think it is a correct statement to say that whereas the localization even of tumors is made with great difficulty, the localization of abscesses is often more difficult still.

Francis T. Stewart¹ trephined two cases in which a diagnosis of abscess of the brain had been made, but failed to find pus. Both of these patients died, and one

¹ Personal communication.

proved to be a case of uræmia on post-mortem; autopsy was not obtained in the second case. He also saw several cases in which the surgeon failed to find pus, although diagnosed as abscesses. He also reported several cases in which pus was evacuated after the skull had been opened for other conditions and in which pus was not suspected. He also mentions another case in which an extradural abscess was evacuated and the patient died from a cerebral abscess. Another case which came under his observation was one of thrombosis of the lateral sinus which he drained, and in which an eminent neurologist subsequently made a diagnosis of abscess of the brain, owing to the persistence of symptoms, but in which the autopsy revealed no suppurative lesion other than that of the sinus.

Gardner¹ reports a case of abscess of the temporo-sphenoidal associated with aphasia, alexia, agraphia, and ptosis, which he explains by the fact that from the temporal lobe a band of associated fibres, which have to do with speech, proceeds to the frontal lobe, and a second band, a lesion of which causes alexia, extends to the occipital lobe.

Although an abscess of the temporo-sphenoidal lobe may be present and usually does exist for a period without producing definite symptoms, the following case, nevertheless, shows conclusively that pus confined within the temporo-sphenoidal lobe may suddenly produce symptoms closely simulating those of sinus thrombosis.

The patient, a man fifty-two years of age, suffered for the past forty-two years from the recurrent type of chronic otorrhoea, a sequela of measles; the intervals between the periods of aural discharge ranged from six weeks to four years. He was repeatedly advised not to have his ears treated, "as it might go to the brain," so he simply syringed the ear with weak soap suds whenever

¹ *Med. Record*, Aug. 3, 1901.

there was any discharge present. It is worthy of note that during the past two years his acute exacerbations were progressively more frequent and accompanied by severe pain over the mastoid and adjacent region.

The writer saw him during his last attack, it being unlike any of the former ones, and characterized by an abrupt cessation of the discharge, the temperature suddenly rising to 105.2° , with severe pain in and around the ear, being especially severe over the mastoid. He had severe chills, followed by marked remission in the temperature and severe sweating. Optic aphasia was well marked. These symptoms being characteristic of sinus thrombosis, an immediate operation was advised. Careful examination did not show the slightest evidence of jugular involvement. During the Stacke operation a moderate amount of necrotic bone was removed; the greater part of the process, as is usual in chronic cases, was exceedingly dense and difficult to remove. The bone covering the sinus was hard and apparently healthy, except in some few spots, where eburnation was not yet complete. Much to my surprise, the sinus, when exposed, proved to be entirely normal. The only point at which free pus was found was in the tympanic cavity and the mastoid antrum, and even there in very small quantity.

Further examination revealed a small carious opening through the tympanic roof, which, upon being enlarged, revealed a quantity of foul-smelling pus oozing through an inadequate opening in the dura. Both openings were then enlarged to provide proper drainage; a large probe was introduced through the fistulous opening which led into the temporo-sphenoidal lobe, and upon its withdrawal an additional quantity of pus escaped. Following this, the active symptoms promptly subsided, the patient making a slow but uninterrupted recovery. Bacon reports a case somewhat similar to the above.

The following interesting case came under the joint

care of Dr. Francis Stewart and myself, and illustrates our faulty methods of brain localization.

The patient, a Russian tailor, aged twenty-four years, was admitted to the Jefferson Hospital, October 21, 1906. His parents, three sisters, and four brothers are living and in good health, and there is no history of cardiac, renal, tuberculous, or malignant disease in the family. He never had any of the diseases of childhood, although at one time during infancy he was exposed to severe cold, which may have been the cause of his ear trouble. At any rate he has suffered from a recurrent suppurative otitis media of the left ear from early childhood, the discharge at times being profuse, offensive, and brownish-yellow in color.

About six years ago the discharge suddenly ceased, after exposure to severe inclement weather; pain and tenderness developed in the mastoid, together with redness and swelling of the overlying skin. The physician who was consulted at the time made an incision through the soft parts and evacuated a large quantity of foul-smelling pus, thus relieving the mastoid symptoms, but not apparently affecting the otorrhœa. The general health has always been good and no history of venereal infection could be obtained.

Present Trouble.—As nearly as can be learned, the patient had dull headache, malaise, and loss of appetite for two weeks prior to entrance to the hospital. Two days before admission the aural discharge disappeared rather abruptly, the left mastoid became tender and painful, and a dull unilateral (left-sided) headache developed. The following morning mental symptoms, chiefly of a homicidal nature, appeared, although the patient seemed quite rational at times. There has never been chill or vomiting.

On admission the patient was dull and apathetic, but not delirious, although very restless at times. The respirations were accelerated, the temperature 103° F., and the pulse 60. The bowels were constipated, and there was slight nausea. The unilateral headache was the only symptom which seemed to be annoying. The pupils were normal in size, equal, and reacting to light. The tongue was thickly coated, the breath foul, and the fauces slightly hyperæmic. The thoracic and

abdominal organs were apparently normal. The left auditory canal was narrow and blocked with thick, foul pus. The skin over the mastoid process showed the effects of a blister which was applied by the attending physician, and a slight depression due to the former operation. There was slight tenderness on deep pressure towards tip, but no distinct swelling or redness. Upon cleansing the auditory canal, abundant pus of a foul odor was encountered. The entire membrana tympani, as well as the ossicles, had been destroyed, and there was a distinct drooping of the superior and posterior wall of the external auditory canal, and a carious opening leading through the same and communicating with the mastoid cells. Examination of the eye grounds gave a negative result. The neurological examination was also negative, save for mental hebetude. The urine showed no abnormalities.

The radical operation was performed by the writer, Oct. 22, 1906. An old sinus was encountered above the mastoid, a little higher than the level of the auricle. There was some pus and much softened bone, removal of the latter necessitating exposure of a portion of the lateral sinus. After thoroughly curetting the middle-ear cavity, the old sinus was enlarged with the chisel, considerable pus being evacuated after reaching the dura. The abscess cavity lay in the temporo-sphenoidal lobe and comfortably admitted the index finger above the second joint. It was washed out with salt solution and return drainage tubes inserted. A few silkworm-gut stitches were then inserted above and below the exit of the tubes and the remaining space filled with gauze. After operation the head was elevated, stimulants administered, and elimination encouraged. Morphine hypodermically was needed on several occasions, as the patient was delirious and quite restless. Six days after this operation the patient again began to show signs of cerebral compression.

A second neurological report by Dr. A. Gordon is as follows :

"The patient presents marked mental hebetude. It is difficult to arouse him. At times he would clear up, and then it is possible to make him execute some acts necessary for examination. Simple acts he would perform, but with delay.

Complicated acts are not done by him because, I believe, of impaired comprehension. The physical symptoms are as follows: When told to raise his foot, he would first bend the leg over the thigh, and the thigh over the pelvis, and only then the foot. When told to raise his hand, he would first bend the forearm over the arm, and only then raise the entire limb. The phenomenon was present on both sides. The knee-jerk is exaggerated on the right and diminished on the left. There is a slight Babinski on the right, but a distinct paradoxical reflex on the left. No ankle-clonus on either side. The reflexes of the upper extremities are exaggerated. There is hyperalgesia in the lower extremities and hypalgesia in the upper. There is apparently no cranial nerve involvement, but this cannot be accepted as absolutely correct, as in view of his mental condition it was difficult to make the patient execute uniform movements at each test, either with his eyes or facial muscles. The tongue, however, protrudes to the right.

"In view of the irregularly distributed symptoms and chiefly because of the presence of the above phenomena in raising the foot or hand (asynergia), the cerebellum is probably involved."

The following day the pulse was 45, the temperature 97° F., and mental hebetude quite marked. As these symptoms increased during the following three days, exploration was decided upon.

Second Operation, by Francis T. Stewart. The original incision was separated and the opening in the skull enlarged. After exploring the abscess cavity with a negative result, the scalp incision was carried backwards and downwards, and the cerebellum exposed with gouge and rongeur. The cerebellum bulged into the opening, showing increased intracranial pressure, although the pulsation was quite evident, and no pus could be found with the needle and trocar, not even by an incision. The temporo-sphenoidal lobe was, therefore, again explored, and a satellite abscess, containing perhaps a dram of pus, discovered above and in front of the original abscess cavity, apparently separated from the parent abscess by a very thin wall of healthy brain tissue. A double drainage tube was inserted into this through the original cavity, and

iodoform gauze placed over the cerebellum. Following the operation, the patient's condition was very poor, and he was given vigorous stimulation and saline infusion.

The following day (Nov. 2, 1906), somnolency was marked, but the general condition somewhat better; rectal feeding was necessary.

(Nov. 4, 1906.) He answered when spoken to for the first time since the second operation, and took food by mouth. The pulse was quite weak. The patient was extremely restless at times, and was unable to recognize his surroundings.

(Nov. 5, 1906.) Fed through nose and by nutrient enemata. A little weaker.

(Nov. 7, 1906.) Condition same.

(Nov. 8, 1906.) Unable to speak, but noticed when spoken to. Hypodermoclysis. Sudden elevation of temperature.

(Nov. 9, 1906.) Slightly better circulation.

(Nov. 10, 1906.) Decline of temperature. Spoke some. Much clearer mentally.

(Nov. 12, 1906.) Much improved. Answers questions. Wound discharge free and still foul.

(Nov. 14, 1906.) Some slight signs of compression. Tubes carefully cleaned, and by Nov. 15, 1906, patient much improved.

(Nov. 20, 1906.) Patient got out of bed and walked about eight feet.

(Nov. 23, 1906 to Nov. 26, 1906.) Patient irritable and noisy.

(Nov. 26, 1906.) Morphine and hyoscine resorted to.

(Nov. 27, 1906.) Patient clearer than ever before. Was able to tell and spell his name, spoke of business, etc.

The patient left the hospital about the middle of December and was seen only a few days ago, and has improved markedly, both mentally and physically, being able to return to work.

In conclusion I wish to remind you that in the foregoing interesting case, with the exception of the otorrhœa, there was an entire absence of diagnostic symptoms suggesting either the nature of the brain lesion or its location. Had it not been for the fact that an old sinus was discovered,

we would have been in absolute ignorance as to the exact location of the pus formation. Furthermore, had the temporo-sphenoidal lobe been explored in the usual way, it is unlikely that all the pus would have been evacuated, from the fact that satellite abscess formation had already formed.

There was also an entire absence of either chill or vomiting.

Repeated examinations of the eye ground gave negative results, while the neurological examinations were of little or no diagnostic value.

REPORT OF THE FIFTEENTH MEETING OF THE
GERMAN OTOLOGICAL SOCIETY HELD
AT VIENNA, JUNE 1 AND 2, 1906

BY DR. SCHROEDER, ERLANGEN.

Translated by Dr. PERCY FRIDENBERG, New York.

HINSBERG (Breslau) on **labyrinth suppuration** reports statistics agreeing with those of Friedrich. Labyrinthine suppuration occurs once in each one hundred cases of purulent middle-ear disease, so that it is more frequent than all the intracranial complications (meningitis, brain-abscess, sinus-thrombosis) combined. The labyrinth also affords a path of infection for the meninges, and for about half the cases of cerebellar abscess. Males are more often affected than females (33.3, Breslau Policlinic). The affection is usually unilateral. After a consideration of the theoretical possibilities in infection of the labyrinth, the reader of the paper called attention to the following two paths as of practical importance from the standpoint of aural surgery.

1. From the middle ear, only after destruction of the bony wall of the labyrinth at some point:

- (a) By injury.

- (b) By inflammatory processes.

2. By way of the posterior surface of the petrous portion after rupture of a deep-seated extradural abscess.

In regard to the first form, the most important injury which may occasion labyrinthine suppuration is a fracture of the base of the skull. Injuries of the labyrinth by projectiles or foreign bodies introduced through the external meatus are less apt to be followed by this complication. In the case of foreign bodies there is generally an added element of injury by direct violence. Traumatic perforation of the

labyrinth may also occur at operation, intentionally or otherwise.

While the various forms already mentioned must be borne in mind, they are of slight etiologic importance compared with the suppurative processes. Acute otitis rarely leads to labyrinthine suppuration, if we except protracted cases, and those of scarlatinal panotitis in which arrosion of the labyrinthine capsule is not at all uncommon. Of chronic forms, cholesteatoma and tuberculosis are most apt to destroy the inner wall of the tympanic cavity and antrum. While perforation may take place at any point, it shows a preference for the two fenestra, the promontory, and the ampulla of the horizontal semicircular canal. In regard to fistulæ of the semicircular canal, the reader agreed with Friedrich, Kuemmel, and Goerke, that they are of minor importance as paths of labyrinthine infection. On the contrary, the most frequent point of perforation is the fenestra ovalis, then the secondary tympanic membrane, and finally the promontory. Several "fistulæ" are often found together. Multiple fistulæ, however, are seen rather frequently when pus breaks through from within outward. In the course of an otitis media purulenta a deep-seated extradural abscess may develop over the posterior surface of the petrous portion. The suppuration may now spread, by arrosion of the posterior or upper semicircular canal, to the labyrinth itself. (Cases of Jansen, Habermann, and of the speaker.) Hinsberg then discussed the development of fistulæ of the semicircular canals, drawing a distinction between primary fistulæ, caused by pus penetrating into the depths, and secondary fistulæ, by perforation, from within outward, of pus which had entered the labyrinth by some path or other.

In case of purulent perforation of the round window, the foot-plate of the stapes is either completely destroyed or perforated, or the annular ligament is more or less completely disintegrated.

Perforation of the oval window and at the promontory can usually be detected microscopically, after removing the granulations, while perforations of the round window can never be seen with the naked eye. Destruction of the inner

wall of the tympanum is usually due to caries, rarely to necrosis, although the latter change may occur, particularly at the ampulla of the semicircular canals.

The spread of infection to the labyrinth depends on the path and nature of the infecting agent, its virulence, the natural protective powers of the organism, the location of the perforation, and, last but not least, the more or less favorable opportunities for drainage and escape of the pus. Thus we may have diffuse or localized labyrinthine suppuration, the latter more commonly in case there has been a reactive inflammation with the formation of adhesions of a protective nature which may prevent the spread of the suppuration for a time or even permanently. The last possibility seems to be given most frequently by a cholesteatoma. The tissue changes in the labyrinth are generally most marked at the point of entrance of the pus; *e. g.*, in case of perforation through the oval window, in the vestibule and the scala vestibuli; in case of perforation through the membrana tympani secundaria, in the scala tympani. The changes may spread continuously from the port of infection or may skip certain sections of the inner ear. The latter condition is noted quite frequently in suppuration following fracture of the base.

The reader of the paper then discussed the ways by which suppuration may reach the cranial cavity from the interior of the labyrinth. This may take place by pre-formed paths, or the pus may make its way by arrosion of the capsule of the labyrinth at any point, but most frequently, of the upper or posterior semicircular canal. The pre-formed paths are:

1. Spontaneous dehiscences over the eminences for the posterior or upper canal (very rare; one case of Dunn's).
2. The acoustic nerve.
3. The aqueducts.

Infection by way of the aquæductus cochleæ seems to be more common than was formerly believed. In case of infection through the aquæductus vestibuli, an empyema develops in the saccus endolymphaticus. The latter form of infection has now been reported in twenty-five cases. Boesch claims that it would occur still more often but that the narrow bony canal is generally occluded by a barrier of granulation tissue.

Empyema of the endolymphatic sac leads in a few rare cases to a rapid destruction of the cerebral wall and stormy meningitis. Generally, however, the affection runs so slow a course that there is plenty of time for adhesions to form about the sac. Diffuse meningitis is thus prevented, while cerebellar abscess is a frequent result (59 per cent. of Boesch's cases) and this leads to secondary involvement of the meninges.

The reader then discussed in detail the path of infection through the aquæductus cochleæ and the nerve channels.

All paths described and hitherto reported lead to the posterior cranial fossa. This should always be borne in mind and special attention paid to the cerebellar fossa on the development of even slight cerebral symptoms in the presence of a recognized labyrinthine affection.

In order to understand the symptoms of inner-ear suppuration, we must bear in mind that this section contains not only the auditory organ but that of static equilibrium as well, and that each of these organs may present positive or negative symptoms depending on irritation and on loss of function, respectively. Irritation of the terminal elements in the cochlea causes subjective sensations of sound, that of the vestibular and canalicular system, vertigo, disturbances of equilibrium, nystagmus, nausea, and vomiting. Destruction of the terminal elements in the labyrinth causes deafness when the cochlea is involved, and, when the ampullar nerve-endings are affected, disturbance of equilibrium, *without* vertigo or nystagmus. These data make it easy to understand the clinical picture of labyrinthine suppuration, particularly of the manifest forms, but the relation between symptoms and pathologic changes is not yet cleared up. Symptoms of irritation may depend, as Jansen has pointed out, on a combination of anatomic changes and increase of intralabyrinthine pressure. Hinsberg then described the symptoms as we see them at the bedside; the vertigo, the nystagmus, the nausea and vomiting; then subjective sensations due to irritation, and the negative symptoms due to loss of function of the cochlea. There is little or no fever in uncomplicated cases of labyrinthitis. A rise of temperature usually means that bacteria or toxins have advanced along the nerves or through the aqueducts into the cranial cavity, and have

produced cerebral complication. Changes in the optic nerve-head, paralysis of the abducens, and slowing of the pulse are very improbable in uncomplicated labyrinthitis. The influence of inner-ear suppuration on the pupil has not yet been explained. In discussing the course and termination of labyrinthine suppuration, Hinsberg mentioned the factors which predispose to a sudden extension of the purulent process to the interior of the cranium, even in latent cases. One such factor is the retention of pus in the middle ear. In case a direct communication is present, this of course leads to damming up of pus in the labyrinth. Neglected otitis with marked formation of granulations, infection, or swelling up of cholesteatoma, extraction or cauterization of polypi may lead to such occurrences. These factors are not the most common. Usually we see after some major operation in aural surgery a sudden development of acute meningitis in a patient who was apparently in good health except, of course, for the local affection. We know now that at least in one half of these cases an unrecognized latent labyrinthitis was the connecting link. Statistics were submitted by H. showing the danger of major operations.

In the diagnosis, static and dynamic tests of equilibrium and careful tests of hearing are important. The methods recommended by Bezold are to be carried out. This must be completed by laying open the middle ear and carefully inspecting the wall of the labyrinth for fistulæ or translucent spots in the canal walls. H. also deprecates any fear of the region of the oval window, and shows how this region can be attacked without danger to the patient. The same thing holds true for the promontory and the round window.

Basing on the functional examination before operation in connection with the conditions found during operation in the labyrinth wall, H. distinguishes the following types of disease:

1. Diffuse labyrinthine suppuration. Symptoms:

(a) Before operation:

Deafness and evident irritative or defective phenomena in the apparatus of equilibrium.

(b) During operation:

Defect of the stapes, possibly complicated with fistula of the semicircular canal.

2. Localized disease of the semicircular canal. Symptoms:

(a) Before operation:

Symptoms of irritation with comparatively good hearing.

(b) During operation:

Fistula of the semicircular canal. (Stapes preserved.)

or

(a) Before operation:

No irritative or defective symptoms, with comparatively good hearing.

(b) During operation:

Fistula of the semicircular canal.

Finally there are cases of labyrinthine irritation in which no infection has taken place. The details must be read in the original paper. In the differential diagnosis of cerebellar abscess and labyrinthine suppuration, H. gives a number of new and important points. The mortality reported by various authors varies from 25 to 86 per cent. In diffuse otitis interna, according to H., it is at least 15-20 per cent.

As to **treatment**, the first consideration is to give free egress to the products of inflammation pent up in the inner ear, and to prevent re-infection from the purulent focus in the middle ear. To effect this, H. claims that it is necessary to open up the cavities of the labyrinth as widely as possible from the middle ear. A statistical résumé of the cases in which this postulate was met shows that the mortality has already been reduced to 4.2 per cent. H. discusses in detail the indications for immediate operation and for temporizing. The operative technique is described with relation to topographical landmarks. H. at first followed Jansen's method, but has now devised an original procedure, starting at the oval window. Neumann's method is considered the best for a number of cases in which there is a complication with deep extradural or cerebellar abscess. During operation it is well to watch for an escape of cerebro-spinal fluid. H. has never seen any fluid in case of diffuse involvement of the labyrinth while it is invariably met with when a normal inner ear is laid open wide. Healing takes place from the depths

by granulation and epidermization. Operated cases invariably show complete deafness and symptoms of defect in the static apparatus.

Discussion: HERZOG (Munich) has for the past year examined the ears of every patient admitted to the hospital for pulmonary tuberculosis. He found that of 100 tuberculous males, seventeen were affected with chronic otitis media purulenta, twenty-one ears in all. In six of these suppurating ears, functional tests showed deafness (labyrinthine involvement); in three cases this deafness had developed while the patient was under observation. The six ears represented five patients, so that 5 per cent. of the tuberculous males had labyrinthine suppuration. One of these cases is reported in detail on account of the unusual course in regard to functional examination. The patient was forty-three years of age, and affected with advanced phthisis. There was a double otitis media with tubercle bacilli in the discharge. The left ear was completely deaf; the right ear could distinguish a whisper at 5cm. Accompanying bone disease necessitated opening the mastoid on the right side. Four months after the operation, this ear also became completely deaf. A little while later, and this is the surprising feature of the case, remnants of hearing began to reappear in this ear, which had been unquestionably and completely deaf. These traces appeared as islands in the field of audition, as it were, so that there were at first defects, but after a time there was a continuous normal stretch from the small octave to nearly the normal upper-tone limit. During the entire time of observation there was no evidence subjective or objective of disturbance of the vestibular apparatus, but during the removal of the sequestrum, noted above, it was remarked that each time the horizontal canal was touched, there was marked nystagmus. This case came to autopsy, and the post-mortem finding in connection with the clinical data led to the assumption of a perforation of the pus from the middle ear into the labyrinth through the region of the promontory.

KUEMMEL (Hamburg) analyzed the data submitted by Hinsberg, and cannot admit that labyrinthine involvement is specially frequent in tuberculous otitis media. In twenty-six cases operated by him, tuberculous labyrinthitis was

found in six. Of these, three were a special type of "necrosing" tuberculosis. Careful histologic examination would probably show tuberculosis to be a factor in a still larger percentage of sequester formation in the labyrinth. Necrosis in tuberculous otitis presents a typical clinical picture in children. One sequestrum after the other is cast off, so that the entire petrous portion may be extruded. In many of his cases K. had the impression, at first, that they would run a favorable course, but eventually all of them died of meningitis. In all cases of rapid extensive destruction of the labyrinth tuberculous changes should be looked for with extreme care.

PANSE (Dresden) lays stress on the necessity and possibility of recognizing an affection of various parts of the labyrinth, and presented microscopic specimens in support of this contention. He submitted a diagram for uniform use, and advised careful histological examination of as large a number as possible of auditory and equilibrium organs which had been tested functionally *intra vitam*.

V. FRANKL-HOCHWART thinks it of importance to consider the occupation of the patient, and to ask what motions are usually made, and which now are difficult or cause vertigo.

SCHUBERT (Munich) notes that vertigo is very unusual and very slight in tuberculous affections of the inner ear.

HEINE (Koenigsberg) presented a statistical report from Lucae's clinic in Berlin. In 277 cases seen, there was a mortality of 8.3 per cent.

PASSOW (Berlin) reported post-mortem findings which were of great importance for a further study of the paths of infection from the labyrinth to the meninges. Macroscopically, a typical empyema of the saccus endolymphaticus was made out. Microscopic examination showed quite unexpectedly, that the aquæductus vestibuli and the saccus were free, and that an extradural abscess had simulated a pus-accumulation in the sac. It appears, accordingly, that the diagnosis of empyema of the saccus endolymphaticus can only be made with certainty on the basis of a microscopic examination.

BRIEGER (Breslau) found isolated fistulæ of the semicircular canals in only very few instances. Translucent spots may occur in perfectly normal cases. He agrees with Kuemmel as

to the frequency of tuberculosis as a factor in labyrinthine suppuration.

POLITZER (Vienna) remarked that labyrinthine suppuration may extend to the peripheral portion of the auditory nerve, and may even then become limited by demarcation. The meatus auditorius internus must accordingly be considered in labyrinth operations.

HABERMANN (Graz) reported a case of perforation through the oval window with loosening of the foot-plate of the stapes. Functional examination showed that such a loosening may cause a marked increase in the bone-condition.

SCHOENEMANN (Berne) discussed the embryology of the labyrinth and its development, particularly in regard to topography.

PANSE (Dresden) repeated his views as to the rarity of fistulæ of the semicircular canals, which, when they do occur, are prognostically favorable.

GOERKE (Breslau) thinks macroscopic examination must be superseded more and more by careful histological investigation. He has observed an undoubted case of empyema of the sacculus which was then demonstrated. His investigations show that pus rarely makes its way through dehiscences.

Voss (Berlin) presents statistics of nineteen cases seen at the Charité.

ALT (Vienna) reports a case in which the degenerated facial nerve came out with a sequestrum. He will attempt to restore the function of the nerve by operative anastomosis with the hypoglossus.

NEUMANN (Vienna) presents the present standpoint of the Vienna school (Politzer) in regard to operation in labyrinthine involvement. As soon as suppuration has been determined beyond a doubt, the radical operation is performed in every case. The question whether to open the labyrinth at this time or to temporize, is decided by the conditions found at operation (fistula), and by the condition of the labyrinth, functionally, as determined by tests before operation.

BARANY (Vienna) describes in detail the methods used in Politzer's clinic to determine the condition of the vestibular apparatus. Syringing with water at different temperatures (test for "caloric nystagmus") was the most reliable method.

HABERMANN (Graz) believes syringing, particularly with cold water, to be rather dangerous.

DENKER (Erlangen) raises the same objection to the hopping test which shakes the patient up seriously and may cause trouble.

WANNER (Munich) alludes to the danger of tests in which forced turning is used.

BRIEGER mentions a method of getting footprints in case of suspected ataxia or disturbance of equilibrium. The soles of the patient's feet are painted with 5 per cent. solution of ferro-cyanide and he then walks on a strip of linen impregnated with liquor ferri.

BARANY (Vienna) demonstrated an apparatus to examine abnormal rotation of the eyes.

In the discussion on **operative technique**, attention was called by Kuemmel to the marked tendency of the labyrinth to heal up. Bearing this in mind it is important to make a sufficient breach in the round window and in the anterior portion of the cochlea. Newly forming pus then escapes of its own accord and spontaneous healing can take place.

NEUMANN (Vienna) lays stress on the rapid healing made possible by his method. Complete epidermization takes place in eight weeks. On the other hand, when the labyrinth is opened from the tympanic side, danger to life is removed, it is true, but the patient is exposed to a long convalescence which may last for a year or more, before complete healing takes place.

DENKER (Erlangen). Demonstration of a new method of **operation for malignant tumors of the nose**. Almost all previous methods require a solution of continuity of the skin of the face, and are followed by more or less disfigurement. This procedure is entirely sub-mucous. The steps are as follows: Horizontal incision through the mucous membrane, *1 cm* above the margin of the gum, beginning above the wisdom tooth, and extending forward to and about *1 cm* beyond the frenulum, then turning upward to the margin of the pyriform aperture. The soft tissues are then pushed back with a periosteal elevator as far as the lower orbital margin, so that the facial surface of the superior maxilla, including the aperture pyriformis is exposed. Beginning at the margin

of the latter aperture, the mucous membrane of the lateral wall of the lower and middle meatus is lifted off blunt, and the inferior turbinate separated from the bony crest with strong scissors. The facial wall of the antrum is now resected, and the cavity cleaned out if necessary, with removal of the lateral wall of the nose. Up to this point it is possible to prevent the entrance of blood from the field of operation into the nasal cavity almost completely. The remaining mucous membrane of the lateral wall of the nose is now removed rapidly together with the tumor, the ethmoidal cells are cleaned out, and the sphenoidal sinus opened. A tampon of vioform gauze is then inserted and the oral wound closed. After-treatment, through the nose. If the field of operation be thoroughly exposed it is possible to avoid all danger of aspiration pneumonia and all disfigurement.

ZIMMERMANN (Dresden) on the physiology of tone conduction.

Z. opposes the general view that the percipient fibres receive their final impulse and stimulation from the labyrinthine fluid only, and that the enclosing bony structures are not adapted to the transmission of sounds. The deductions of Boenninghaus from the conditions found in the ear of the whale are not well grounded. In transmission of sounds we have to deal only with purely molecular motion, which, as such, causes no motion of one bone on another or of one bone in regard to another in which it is enclosed. It can be shown that the ossicular chain is not moved any more at the footplate than is the bone of the promontory. The labyrinth water is practically nothing but imbedding fluid and has nothing to do with the conduction of sound, certainly not, as Bezold says, in the sense of a spiral motion from one fenestra to the other. The fluid does, however, allow the finest variations of intralabyrinthine pressure. Each increase of hydrostatic pressure causes a damping, not a stimulation, of the oscillation of the fibres.

V. FRANKL-HOCHWART reviewed the subject of **Ménière's vertigo**.

The classical attack is to be distinguished from accessory vertigo developing in the course of a previous otitis media or labyrinthine otitis, less frequently in affection of the auditory

nerve or in external otitis. Attacks simulating Ménière's disease are also seen coming on in paroxysms with an intact ear, as an aura of an hysterical or epileptic seizure. The classical attack is characterized by fearful rotary vertigo, disturbance of hearing, troublesome tinnitus, ataxia, nystagmus, and vomiting. Vasomotor disturbances are a frequent complication, as are also anomalies of the pulse, diarrhoea, fright, and headache. Between the paroxysms there may be no symptoms except the deafness, although occasionally slight ataxia and nystagmus are observed. The recognition of Ménière's apoplexy with severe disturbances of consciousness, paralyses, and so on, is usually easy, although just in these cases sudden deafness is usually not found.

It is much more difficult to recognize the vertigo occurring as an aura in the accessory forms, especially if the patient be seen when free from the paroxysm. The ears should be carefully examined in every case, particularly every medical case, complaining of vertigo. If there is no disturbance of hearing, vestibular vertigo is very improbable, if not entirely out of the question. In case of deafness, there is always suspicion of vertigo ex aure læsa.

The vertigo observed in cases of oculomotor paralysis, in acute infectious diseases and in syphilis has little resemblance to Ménière's. In a certain class of gastric cases there is possibility of confusion on account of the violent vomiting. In arterio-sclerosis, deafness is not uncommon and the diagnosis may be obscured. In actual cerebral disease such as hemorrhage, softening, tumor, abscess, there is less difficulty in making a differential diagnosis as these affections even when they involve the auditory nerve rarely cause typical rotary vertigo with tinnitus. True paroxysms may occur in locomotor ataxia if the labyrinth and nerve are involved. The reader also referred to a symptom-complex first described by him, that of polyneuritis cerebialis Ménièreiformis. The acute onset of this affection, the occurrence of herpes and of complete facial paralysis, together with the nervous disturbance of hearing, tinnitus, and rotary vertigo, assure the diagnosis.

Neurasthenic vertigo is differentiated from the aural form by the fact that it is rarely a typical rotary vertigo, the

patients do not have to lie down, do not collapse, and tinnitus and vomiting are absent. In cases of hysteria and epilepsy, the diagnosis is more difficult, and just in these cases it is that we meet with a pseudo-Ménière as understood by v. Frankl-Hochwart, *i. e.*, rotary vertigo, tinnitus, and vomiting. The negative finding in regard to the ear, and the occurrence of symptoms characteristic of these two neuroses (loss of consciousness, convulsions, incontinence, etc.) generally clear up the diagnosis. This is most difficult in the cases of so-called "formes frustes" of Ménière's disease. The most peculiar are the forms without disturbance of hearing. The fact that there is an aural lesion can be determined only by the most careful examination with a series of tuning-forks. Even when the ears are quite normal, and the patients not neurotic, the reader is inclined to make an occasional diagnosis of vestibular vertigo, assuming that this apparatus may become affected independently of, or earlier than, the cochlea. He has also seen a number of cases of vertigo without tinnitus, and calls attention, finally to the fact that there are "equivalents" of a severe attack of Ménière's in which rotary vertigo is replaced by a feeling of unsteadiness and of reeling which may be very slight. In fact, at times there may be only pressure-sensation over the vertex and temporary obscuration of vision, without any actual dizziness whatever. As to the prognosis of Ménière's vertigo, about 50 per cent. recover from the vertigo—that is, the deafness is always lasting or even progressive.

BRÜHL (Berlin): Contribution to the pathological anatomy of the ear.

The following specimens were demonstrated by the projection apparatus:

1. A case of tabes with deafness. Degeneration in the nuclear region of the acusticus and marked atrophic changes in the cochlea, particularly in the spiral ganglion.
2. A case of ankylosis between the hammer and a-carious incus; obliteration of the fossula of the fenestra cochleæ by connective tissue. Atrophy of the spiral ganglion and "enormously" high jugular fossa. Clinically, this case had been diagnosed as stapes-yanklosis with nervous deafness (hyperplastic, adhesive catarrh).

3. Sections through the cochlea in a case diagnosticated, *intra vitam*, as neural deafness. Finding: atrophy of the ganglion spirale and of the cochlear nerve, more marked in the first convolution of the cochlea.

4. Sections through the cochlea in the case of a blacksmith, diagnosticated, *intra vitam*, as occupational neural deafness. Finding: atrophy of the spiral ganglion and of the cochlear nerve. Loss of Corti's organ in the basal convolution.

NAGER (Breslau): Demonstration of microscopic specimens of the labyrinth and auditory nerve.

This consisted in a demonstration of sections of the diseased inner ear in cases of epidemic cerebro-spinal meningitis, tuberculosis, syphilis, and cholesteatoma; cases of deaf-mutism, congenital and acquired; the latter form in consequence of injury or meningitis. In cerebro-spinal meningitis the reader called attention to the fact established by Siebenmann, that the otitis interna is only a subordinate symptom of the complete malady. This is explained by the close connection between the labyrinthine spaces and the intradural space by means of the nerve-trunk and its lymphatic and vascular spaces, and the aquæductus cochleæ. By means of these paths of infection the interior of the labyrinth may easily participate in pathologic processes of the interior of the cranium in cases of cerebro-spinal meningitis.

PASSOW (Berlin): Variations in the image of the drum due to foreshortening, and the errors of the quadrant division.

The image of the drum membrane which we get in otoscopy does not correspond to actual conditions, but is distorted in proportion to the narrowness of the external canal, and in proportion to the parallelism of the plane of the drum with that of the upper wall. This fact is generally overlooked in practice and is hardly considered at all in the text-books. To demonstrate the actual conditions, P. has had a large number of drums drawn in situ, and then again after removal of the external canal. These drawings show that scars, perforations, deposits, and so on, have a quite different form and are situated in a different quadrant from what the otoscopic image would lead us to expect.

Further investigations showed that our customary division

of the membrana tympani into quadrants is particularly faulty in case of retraction of the malleus by morbid processes.

The division also fails to agree with the anatomic conditions and is untenable. Politzer's division into quadrants by means of a horizontal line through the umbo, and a vertical from the umbo to the periphery, gives a more correct arrangement. The present lack of correspondence should be corrected by practical measures, such as uniform instruction and comparison of the terms used in the publications dealing with this subject, to insure a correct nomenclature and uniform division of the quadrants of the drum.

v. SCHROETTER (Vienna), demonstrated a new **endoscopic tube**. The novel point of this instrument consists in the light being transmitted within its wall, to the point to be observed. This is accomplished by the use of uviol-glass. The tube, coated black on its inner surface, is enclosed in a second, silver tube. The source of illumination is a ring-shaped incandescent bulb, made of glass bent into a spiral and containing a carbon filament. A filament of osmium is now being used with success to prevent rapid heating. At a distance of $\frac{1}{2}$ -1 cm from the lower end of the light there is uniform illumination of the region to be examined.

BEHM (Vienna-Moedling): **On sound-measurement and acousto-technique.**

The reader explained the principles involved and demonstrated the following instruments:

1. A tuning-fork sonometer. This is used to determine and measure the aerial tone waves for a given pitch. By a change of the tuning-forks it may be used for note, and is extremely delicate.

2. A universal sonometer. This allows, among other things, the determination of the maxima and minima of sound in a given space. It is practically of great importance in medical tests of hearing. Tones and vowels can be accurately analysed and demonstrated with this instrument. A demonstration was given. An apparatus can be attached by means of which the vibrations and wave forms can be registered photographically. The demonstration was followed by an exhaustive consideration of the differences between physiologic strength of tone (acuteness of hearing)

and physical intensity of sound, the details of which must be consulted in the original publication.

GUTZMANN (Berlin), On the significance of the sensation of vibration for the voice-production of deaf-mutes and the deaf. To determine the differences of sensibility of the finger for vibrations, the reader had constructed an apparatus in which two tuning-forks, run by electricity, transmit their vibrations alternately to a drum. It was found after careful exclusion, as far as possible, of all sources of error, that by sense of touch the finger can distinguish, without much difficulty, the difference of full tones. The possibility of practising and developing the faculty of distinguishing between the various notes by vibratory sensation, in deaf-mutes and those hard of hearing would be of great value for the voice formations and speech. The sensation of vibration would give to those deficient in hearing the same control of the sound of their own voices that the normal individual gets from tone perception. To apply this method in practice, the speaker advised a comparison with normally hearing children of equal age as a paradigm in the first steps of developing the sense of speech and voice production for vibration sense. The first exercises should begin as early as possible, at all events before the usual age of entering school. In this way we would have some hope of bringing pitch, intensity, and production of the voice under the individual's control in the spontaneous speech of the deaf-mute. The final result would be a marked improvement in the quality of speech of these defectives.

Discussion: BARTH (Leipzig) has made investigations in this field and has arrived at somewhat different results.

BLAU (Goerlitz): Experimental closure of the fenestra rotunda.

Demonstration of Microscopic Specimens: The reader has continued his experiments on dogs and cats with the single modification of using wax-cement as a filling. Immediately after the bi-lateral operation the animals cease to react to any impressions of sound. Suppuration or exudation in the bulla, tympanic cavity, or labyrinth was never observed. Microscopically, the filling was found surrounded or infiltrated by small cells and connective tissue.

Cicatricial tissue was found in the basal portion of the cochlea. Adhesion of Reissner's membrane to the organ of Corti. Flaws, colloid degeneration, or complete disappearance of Corti's organ. After six months, the cochlear nerve was found markedly degenerated. Spiral Ganglion: This was found decreased in size to the point of almost complete atrophy.

BLAU (Goerlitz): The form of the concha in the insane and criminal. The reader has made comparative examinations of the external ear in 206 normal individuals, 210 insane, 243 prisoners, and 20 prostitutes. The principal result of the statistics which are given elsewhere in detail, is to show a marked preponderance of unusually large proportions, so that these classes have an external ear which is functionally more perfect in Schwalbe's sense than that of the normal individual.

GOERKE (Breslau): 1. **Labyrinthine changes in cerebro-spinal meningitis.** The reader examined nineteen temporal bones by means of serial sections. In only two of these, of one and the same case, approximately normal conditions were found; in the other seventeen bones inflammatory changes of greater or less severity were found. The path of infection from the meninges to the labyrinth was found to be the aquæductus cochleæ in three cases, the auditory nerve in eleven cases, the aquæductus vestibuli, probably, in one case, while the remaining cases were doubtful. The pathologic changes in the labyrinth show a marked tendency to recovery. In many cases only isolated sections were affected, while other parts of the labyrinth remained entirely free. A perforation of the fenestra and extension through the tympanic opening to the middle ear were never observed. On the contrary, fibrous, thickened masses of exudation were invariably found upon the fenestra. In some cases, the inflammatory process was limited to the semicircular canals; in others to the cochlea, and in either case circumscribed involvement was frequently noted. It is of interest to note that in many of the cases in which new formation of connective tissue and bone was found in the cochlea, hearing was present in both ears until death.

Discussion: **HABERMANN (Graz)** claims that in every case

of severe cerebro-spinal meningitis, infection and the transmission of the inflammation to the labyrinth takes place solely through the aquæductus cochleæ. The clinical data which prove this are the acute onset of the disease, and the deafness which comes on the first day.

2. Demonstration of **microscopic specimens**:

(a) Empyema of the saccus endolymphaticus in a case of labyrinthine suppuration.

(b) Isolated fistula of the horizontal semicircular canal.

(c) Complete fibrous and osseous degeneration of the labyrinth in a case of tuberculosis.

HOELSCHER (Ulm). The speaker referred to the recent **widening of the field of surgical activity in otology and laryngology**. In aural surgery, the intra-cranial complications, the ligations in the cervical region, are the most important. In rhinology, the radical treatment of tumors of the nasal and accessory cavities, of the mouth and the major operations on the larynx, suggested themselves. These three specialties which are almost always combined in practice are destined, the reader thinks, to be completely separated from general surgery as a special surgery of the head and neck, so that cranial and cerebral disease of any surgical nature, and tumors of the neck, of any kind, will be operated by the otologist and laryngologist, respectively.

These views were combated by several speakers in the discussion which followed.

KIRCHNER (Wuerzburg): **An apparatus for operative exercises on the temporal bone**. The apparatus which was to have been demonstrated had not arrived, and was explained by means of drawings. It consists of an inclined plane, like a drawing board. The temporal bone is fastened within an opening at the middle of the board, and the latter is movable on hinges, so that the preparation may be brought into any position desired, corresponding to operations on drum, tympanic cavity, or mastoid, to be performed on the living subject.

SCHOENEMANN (Berne): **Demonstration of microscopic specimens on the pathologic anatomy of adenoid hypertrophy**.

The reader discussed the question whether the pharyngeal tonsil is to be considered as a product of a disease process or

as a protective organ of normal occurrence and teleologic justification. In case of a decision in the latter sense, we should have to deal in a more conservative manner than has been the case hitherto, with adenoid growths of the nasopharynx. The reader, however, reaches the opposite conclusion, principally on the basis afforded by specimens, demonstrated at the meeting, which show that the lymphocytes in the adenoid tissue do not merely migrate to the surface, without changing the epithelium, but actually *emigrate*, and produce decided histologic changes in the epithelium which result in its destruction. The impression is produced that this process is due to a destructive quality inherent in and peculiar to adenoid tissue. Other epithelial structures, such as glands, are exposed to a similar aggressive action of lymphadenoid tissue.

In support of his theories, the reader demonstrated specimens in which the excretory ducts and lobules of glands had been surrounded, penetrated, and finally destroyed by the proliferation of adenoid tissue.

SCHOENEMANN (Berne): The preservation of the **tone-transmitting apparatus in the radical operation**. A new procedure is described by means of which the middle ear can be thoroughly cleaned out, without sacrificing the ossicles. This S. has entitled the "conservative radical operation." The entire posterior half of the drum is removed by an incision running parallel with and directly behind the handle of the malleus. The section is then carried through the corresponding part of Shrapnell's membrane, and out along the postero-superior canal wall to near the external meatus. A small bent knife is then introduced into the attic, severing the ligamentous connections between the malleus and incus, on the one hand, and the outer attic wall and bony wall of the Rivinian fissure, respectively, on the other. The radical operation is then performed in the usual way. The preliminary operation just described makes it easy to remove the lateral wall of the attic, completely, without disturbing the topographic relations of the ossicular chain. Besides this functionally important factor, Schoenemann's operation has the advantage of simplifying the formation of a plastic flap for the external wound and facilitating the entrance into

the tympanic opening of the attic, by means of the preparatory incision along the canal wall and through the drum.

HABERMANN (Graz): **Occupational deafness.** (A continuation of investigations published in the *Archiv f. Ohrenh.*, vol. xxx.)

H. reports the results of clinical and histologic studies. The first comprise 107 cases, in which permanent deafness had been induced by continued action of loud noises. Careful hearing tests demonstrated the fact that perception of high tones was the first to suffer, and that the hearing never became so bad but that the whispered voice could be distinguished. The second part of the paper presented a careful clinical and histologic study of five cases, of which two had also suffered with arterio-sclerosis, one with acoustic neuritis due to meningitis, and two with tabes. In all these cases, an atrophy of the organ of Corti was found of a progressive nature and involving the nerves of the lamina spiralis, while the ganglion cells of the spiral canal were generally well preserved. In a number of cases, the posterior portion of the foot-plate of the stapes was displaced markedly inwards. A decided, although circumscribed atrophy and cyst-formation in the vascular stria, in the first two cases, is ascribed to the arterio-sclerosis present. In the other two cases, the round-cell infiltration of the nerve, and the stria (in one case) are considered due to the tabes. In one of these cases it is worth noting that, post mortem, a marked lymphocytic infiltration was found in the nerve branch of the posterior ampulla. This case had shown marked symptoms of vertigo with vomiting, and objects appeared to dance before the eyes.

BLOCH (Freiburg): **Deafness in retinitis pigmentosa.** Ophthalmologists note disturbances of hearing in as much as 20 per cent. of all cases of pigment degeneration of the retina. In otologic literature, on the other hand, only four cases have been reported, all by Moos, in Schwartz's handbook. The reader has so far made functional tests of the hearing in eight cases of retinitis pigmentosa. Without exception, he was able to detect a neural deafness, although this was at times exceedingly slight. With the exception of one case, probably complicated with hyperostosis of the labyrinth capsule (Politzer), and commencing ankylosis of the stapes,

the type was that of pure neural involvement. In the advanced cases there was a "concentric contraction" of the acoustic fields, analogous to the condition found in the visual organ. The conducting apparatus was invariably intact. In two cases, consanguinity of the parents was determined. In three cases there was a history of aural disease in blood relations. The reader pleads for careful observation of these cases by otologists.

KUEMMEL (Heidelberg): Clinical and bacteriological studies in acute otitis media. The reader has come to the conclusion that the present system of categories of acute otitis, introduced by v. Troeltsch, depending on the character of the exudation, cannot be maintained.

We have to distinguish:

(a) Simple tubal catarrh, characterized by a lack of actual inflammatory phenomena in the tympanic and accessory cavities, and by the sterility of the secretion.

(b) Inflammatory forms, which are:

1. Meso-tympanic otitis media.

In this form, the inflammation runs its course mainly or exclusively in the principal cavity of the middle ear ("Meso-tympanum"). There is no circumscribed bulging of the drum.

2. Epi-tympanic otitis media.

Here we have, first and foremost, an involvement of the secondary cavities. There is always external evidence of mastoid inflammation, and localized inflammation and bulging of the drum. On the pars tensa, these changes are invariably limited to the postero-superior quadrant. They are rarely seen in Shrapnell's membrane.

The prognosis of otitis media depends upon its type. Involvement of the mastoid structures is to be feared only in the epi-tympanic form. In this type, again, the most dangerous organisms are the streptococcus pyogenes and mucosus. The staphylococcus aureus, on the other hand, was found in fifty inoculations only in cases with a comparatively mild clinical course, although the germ was found to be very virulent in the laboratory control experiments. Operation was required only in the streptococcus otitides. In a single case there was mixed streptococcus and pneumococcus infection.

Details are given as to the exact procedure followed in the inoculations, former bacteriologic findings, and the anatomical basis of the differentiation of the two forms, described above, of middle-ear inflammation. The preparation of a report on this subject, to be presented at the meeting of the Association next year, was assigned to Kuemmel.

HOFFMANN (Dresden): Fever and its causes in otitic brain-abscess. Whereas Leutert ascribes rapidly disappearing transitory fever in the course of brain-abscess to an accompanying serous meningitis, the reader believes such an evanescent rise of temperature with its symptoms to be due on the contrary to a purulent form of meningeal inflammation. This hypothesis is founded on the report of the clinical course of three carefully studied cases of brain-abscess, and more particularly on the character of the fluid drawn off by lumbar puncture.

WANNER (Munich): A case illustrating the relations of tone- and speech-audition. The following findings were made after functional test of hearing of the left ear of an adult patient. The tone-scale of sixteen double vibrations was heard up to G sharp in the middle octave. Then there was a defect extending to G in the third octave above the staff. From this point on, audition was normal, up to Galton 10.5. The deafness of the right ear was so complete, that there was no possibility of a transmission of sensation. In the defect of the left ear we notice a correspondence with that portion of the scale which is most important for the hearing of speech, according to Bezold, namely, $b'-g''$; this defect also corresponds to the portion of the scale in which we find the basal tones for all the vowels and all of the consonants excepting M, N, and R. As a matter of fact, the patient hears no vowels, and R alone, of all the consonants. This case accordingly proves that Bezold's claim that an ear is deaf for speech if it is unable to hear the unloaded a' tuning-fork by aërial conduction is correct, as well as the correctness of O. Wolff's determination of the pitch characteristic of the letter R.

REPORT OF THE TRANSACTIONS OF THE NEW YORK OTOLOGICAL SOCIETY.

By DR. T. J. HARRIS, SECRETARY.

MEETING OF JANUARY 22, 1907. THE PRESIDENT, JOHN E.
SHEPPARD, M.D., OCCUPIED THE CHAIR.

Dr. WHITING reported a case of mastoiditis with 1.75 per cent. of sugar in the urine. The patient was also a hæmophilic and had albumen and casts. Father and brother died of hemorrhage after operation. He was disinclined under these circumstances to operate, but the mastoiditis was so severe that operation was urgently demanded; this showed an epidural abscess in cerebellar fossa. It was done in eighteen minutes. Severe bleeding followed. Packing was carefully applied and then the flaps of the wound were closely coapted as for primary healing. A high saline with gelatine was given, also gelatine internally and antiscorbutic diet. Stitches removed next day. Fifth day, packing was removed; there was moderate bleeding. Patient made a good recovery.

Discussion.—Dr. PHILLIPS reported two cases operated on for mastoiditis which were complicated by diabetes. The first case was a woman of forty upon whom he had operated one week ago. No diabetes was suspected at the time of the operation, which had been performed on the day of her admission. After the operation, 10 per cent. of sugar was discovered. The operation lasted one hour and fifteen minutes and in its course the dura was exposed. The pain and vertigo still persisted and seemed to indicate an intracranial complication. The second case was a man of sixty who had suffered from mastoiditis for several weeks. A large external swelling was present. Operation showed extensive exposure of the dura and sinus. Sugar was discovered in his urine.

Although the operation had been performed a week ago there had been no rise of temperature since.

Dr. KENEFICK spoke of a boy upon whom he had operated some years ago for adenoids who died of hemorrhage. Inquiry showed that there was a clear hæmophilic history. He called attention to the fact that this disease was transmitted by the mother but that only males were subject to it.

Dr. PHILLIPS said in response to inquiry that he had been unable so far to obtain any previous history of diabetes in the case of the woman, and had as yet received no full report as to the condition of the urine.

Dr. GRUENING emphasized the importance of a complete urinary analysis before every operation, and he thought that the prognosis in operation in a case complicated by diabetes rested largely on the presence or absence of acetone and diacetic acid.

Dr. PHILLIPS reported a case operated for acute mastoiditis complicated by facial erysipelas. The pus from the ear discharge showed the pneumococcus. It had been his experience this winter to find that all the cases of mastoiditis on which he had operated which had pneumatic cells filled with granulations showed the pneumococcus in the secretion. The blood count here gave 14,000 leucocytes and 64 per cent. of polynuclear cells. The sinus was uncovered at a second operation undertaken five days later because the temperature did not fall. No granulations were seen on it but it was opened. A free flow of blood followed from both ends. Shortly after a facial erysipelas developed and the temperature fell but the patient began to have double vision. An examination of the eyes showed double choked disk and lateral nystagmus. The veins were dilated and the retinal arteries appeared large. The patient continued to improve and was discharged three weeks after the second operation. The eye symptoms still persist but show a slight improvement. The doctor was not satisfied whether the temperature was due to sinus disease or the erysipelas which later developed.

Discussion.—Dr. GRUENING did not think that choked disk was rare in sinus disease. He had operated once for sinus thrombosis because of the presence of this symptom. An unusual feature of this case was that the arteries

were enlarged. It is the veins that are wont to be enlarged.

Dr. GRUENING reported a case of operation for mastoiditis by the radical method complicated by erysipelas. A man of twenty-six who had suffered from a running ear for years suddenly developed acute otitis and mastoiditis, with a temperature of 105° and streptococcus in the pus. A prompt operation revealed an eburnated mastoid. In the course of the radical operation the roof of the attic was not involved. The next day the temperature continued together with chills. The sinus was exposed, and though free bleeding ensued, the jugular vein was tied and excised. Next day the temperature was 106° and erysipelas developed. This spread to the other side of the head and now the ear on that side had become involved, as well as the mastoid. He inquired if we are justified in operating in the presence of erysipelas.

Dr. WHITING had operated twice in presence of a general erysipelas which was so extensive as to cause excessive swelling of scalp; good recovery followed.

Dr. TOEPLITZ referred to a case of a child recently under his care where he had suspected a retro-pharyngeal abscess and where a short time later erysipelas developed.

Dr. RAE spoke of a case of double mastoiditis complicated with erysipelas where he had operated on both mastoids without any unfavorable results; also a case of mastoiditis with extensive erysipelas, temperature of 106°, where the operation was successful.

Dr. GRUENING said that recovery did not always follow in these cases and cited one of his own where erysipelas developed after operation and death occurred the fifth day from extension to the brain.

Dr. POOLEY remarked that an extension to the meninges was always possible.

The CHAIRMAN said that he had seen one such case.

Dr. PHILLIPS questioned the liability of the extension of erysipelas to the meninges. He could not agree that this was to be apprehended.

Dr. GRUENING replied that the streptococcus of the disease could involve all the organs and tissues of the body. We cannot prescribe its course.

Dr. TOEPLITZ referred to a radical operation followed by erysipelas and death from meningitis.

Dr. HASKIN spoke of a case of mastoid operation where erysipelas was diagnosed as developing on the fourth day. It was later conclusively shown that the real trouble was iodoform poisoning.

Dr. RAB remarked that we can exclude from such a diagnosis all pre-operative cases, for in these no iodoform had been used.

Dr. HARRIS gave a further report of the case of **syphilis of the inner ear** which he reported at the last meeting. Although as high as 360 grains of iodide of potash had been given daily, with 1 grain of salicylate of mercury every third day hypodermically, and muriate of pilocarpin in tea every night to the full physiologic limit, there had been no improvement in the tinnitus. The man could not sleep and was willing to submit to any treatment, operative or otherwise, which promised any relief.

Discussion.—Dr. GRUENING said that he had seen contraction of the muscles at the neck of the bladder from use of pilocarpin. He rarely gave more than one twelfth of a grain in the beginning.

Dr. DUEL had seen tenesmus follow its use.

Dr. GRUENING did not think on account of the fluctuations in the hearing that any operation was warranted.

Dr. DUEL reported a **fatal case of meningitis following an acute otitis media**, the result of the nasal douche. When first seen, there was very slight redness of Schrapnell's membrane; no real pain; normal temperature. The next day a slight bulging of Schrapnell's membrane made him decide to open it under gas. Streptococci were found present in the blood secretion which followed the incision. There was a slight rise of temperature, but the patient complained of only a little discomfort in the ear; a gauze wick was introduced in the canal. The following day there was no increased mastoid tenderness. Hot irrigation was substituted for the gauze wick. Blood examination gave a polynuclear count of 75 per cent.; 23,000 whites. During the next day polynuclear count 86 per cent.; 43,000 whites. There was a slight rise in temperature. On the day after (the fifth day of the

disease) he suddenly became unconscious and died three hours later. A large quantity of sugar was discovered in the urine. Spinal puncture showed streptococci and pus.

Discussion.—Dr. LUTZ spoke of a similar case which he had seen. The patient had been in the ocean bathing. The following day the ear began to pain and discharge. Delirium followed on the second day and death.

Dr. HARRIS mentioned a case of meningitis in a man of twenty-five which resulted fatally on the fourth day. There was no involvement of the mastoid, which was opened. The only symptom complained of was intense pain in the ear. There was no bulging of the drum. An early opening of the drum had been practised.

REPORT OF THE TRANSACTIONS OF THE SECTION
IN OTOTOLOGY OF THE NEW YORK
ACADEMY OF MEDICINE.

REGULAR MEETING, NOVEMBER 8, 1906 (CONCLUDED), DR.
GRUENING IN THE CHAIR.

A case of syphilitic mastoiditis, presented by L. M. HURD, M.D.

The patient, a little girl of four years, had her adenoids removed December 18, 1905. Three days later she complained of earache followed by a purulent discharge and a painful swelling over the mastoid process. The patient was seen June 6, 1906, when the following condition was found: Profuse purulent middle-ear discharge with tenderness over the antrum and a fluctuating tenderness back of the tender spot about the region of the sigmoid sinus. The nose was discharging muco-pus freely. Temperature 100°. The patient was operated upon that afternoon. The fluctuating swelling contained pus and was situated between the connective tissue layers, not under the periosteum. The mastoid cortex appeared normal. The cellular tissue was softened and discolored; the antrum was full of pus and granulations.

The resulting wound after several weeks showed no tendency to heal; from the edges of the wound and antral cavity pale grayish granulations rapidly grew, which promptly re-formed on removal. Four weeks after opening the mastoid the patient was anesthetized and the wound curetted and the skin edges partly sutured. These sutures were removed at the end of the seventh day, when the wound again fell apart and the cavity was full of the same unhealthy granulations. These were removed and sent to the pathologist, who reported them to be syphilitic granulomata. Dr. Jonathan Wright stated in his report that "under the low power the

section has a patchy look; the round cells are crowded together in places, less thickly in others. There is very much cellular fragmentation, which is out of all proportion to the coagulation-necrosis, much more abundant than in tuberculosis. This is syphilis nine times out of ten." The patient was given intramuscular injections of mercury salic., gr. one-half once a week, with K. I. by mouth. Soon after two gummata appeared, one above, the other below the auricle, which promptly broke down and were opened. Otherwise the child has shown no specific symptoms and has gone on to uninterrupted recovery.

It has been impossible to find any syphilitic history in either parent or in the child's attendants. It has also been impossible to make satisfactory hearing tests to discover if the nerve was involved.

Discussion.—Dr. GRUENING said that it would be interesting to know just what syphilitic granuloma is and how the pathologist diagnosticates it.

Dr. COAKLEY said that one sees these syphilitic granulomata and frequently gets this report from tissue sent to the pathological department, and upon putting the patient upon antisyphilitic treatment the growths disappear. There were certainly pathological changes and appearances in which he did not feel that he personally knew enough to make such a diagnosis, and while a skilled pathologist might not always be willing to say that the granuloma was distinctly specific, there were certain characteristics which pointed very strongly to that conclusion.

REGULAR MEETING, DECEMBER 13, 1906, DR. EMIL GRUENING
IN THE CHAIR.

Report of a case of mastoiditis complicated with thrombosis of the cavernous, of the inferior petrosal, and of both lateral sinuses, leptomeningitis, etc. R. LEWIS, JR., M.D. (Published in full on pages 10-14, with autopsy report by G. S. DIXON, M.D.)

Discussion.—Dr. GRUENING said that, as he understood Dr. Lewis, the jugular was tied on the left side. He had reported some time since a case of double sinus thrombosis in which one jugular was tied, and the patient recovered. In

the present case he was inclined to think that the second jugular should not have been tied.

Dr. SPRAGUE inquired whether Dr. Dixon had found any unusual anatomical condition of the sinus on the left side. Usually the left lateral sinus does not go to the torcular, excepting through the straight sinus, which is smaller.

Dr. RICHARDS said that several years ago, at the Otological Section of the Academy, he presented a patient upon whom he had operated for sinus and jugular thrombosis, the thrombus having extended from the middle of the jugular in the neck to the torcular. As he did not during the operation feel justified in passing a curette into the torcular for fear of dislodging a portion of clot and starting emboli through the opposite side, he was preparing to explore the torcular and its confluent sinuses, when it occurred to him to block the jugular of the opposite side by firm pressure high up on the neck. This was done, with the result that the clot in the extreme torcular end of the sinus was expelled. He thought the procedure worthy of trial, and a means by which we might in certain instances avoid the ligation of the opposite jugular.

Dr. LEDERMAN said that some time ago he had read the report of a case in which both internal jugular veins were ligated, and the autopsy showed marked disturbance of the cerebral circulation.

Dr. GRUENING said that he could not recall that any case of double thrombosis had been reported in which double ligation had been resorted to. Since he had reported a case of double thrombosis with ligation on one side he had been looking out for cases of this kind.

Dr. DENCH said that he had seen a case of suspected thrombosis on both sides, and had shut off one vein and exposed the other. This was so big that he had hesitated to shut it off. He did not know of any case where both veins had been shut off simultaneously, though a number had occurred where one had been shut off, and then the other after an interval of a few days. He thought that shutting off both veins at the same time would have a dangerous effect on the circulation.

Dr. LEWIS, in reply, said that he had been able to pass directly and without any difficulty into the sinus on the

opposite (the right) side with the curette. This curettement was performed five days after the first operation and so, as in all likelihood the collateral circulation had been fairly established on the left side, the tying of the jugular on the right side would not have been such a serious matter as some of the gentlemen would have us believe. He certainly would attempt it in a similar case rather than be responsible for dislodging a portion of thrombus and allowing it to be carried down into the heart. He thought that Dr. Richards's point, that pressure on the internal jugular vein and massage of the vein from below upwards was a good one and might be substituted in some cases, or at least attempted before proceeding to tie the vein.

Dr. DIXON said that he had noticed no abnormality in the sinus. Most of it, of course, was obliterated.

Report of four cases of mastoiditis in diabetic subjects, by J. D. RICHARDS, M.D. (published in full on pages 15-33 of this number).

Prognosis of operative procedures on the mastoid process in diabetic subjects, by E. L. MEIERHOF, M.D. (published in full on pages 34-43 of this number).

Discussion.—Dr. DENCH spoke of three cases of mastoiditis in diabetics, with two recoveries and one death. In the first case, there was a very high percentage of sugar and extensive mastoid involvement. Five days after the mastoid operation the patient developed erysipelas, and his temperature rose to 106°. He ultimately made a perfect recovery. The second case was that of a man who had been a diabetic for a number of years. Seven months before Dr. Dench saw him, he was operated upon for mastoiditis in a neighboring city. When he first came under Dr. Dench's observation, the external auditory canal was dry. There was a sinus behind the ear, from which there was a scanty purulent discharge. A probe introduced into this sinus encountered roughened bone. An examination of the urine showed about 3 per cent. of sugar. A very extensive operation was performed, the dura being exposed in the cerebellar and middle cranial fossæ. The patient did very well after the operation, and was sent back to his own physician, in a neighboring town. After his return home he developed erysipelas, and the percentage of sugar

in the urine increased very rapidly. The patient, however, made a perfect recovery. The third case was that of a woman, well advanced in life, who had suffered from diabetes for a number of years. Several years before the attack of mastoiditis, the patient had had an acute suppurative otitis upon the left side, which was relieved by free incision of the drum membrane. About two years after this attack, the patient again came under observation. At this time the urine was free from sugar, and the diacetic acid and acetone reactions were negative. She was then suffering from acute otitis media in both ears. Both drum membranes were incised, and the patient did well for a number of weeks, although there were some suspicious mastoid symptoms upon the right side, that is, upon the side which had previously been healthy. Quite suddenly there developed a swelling over the mastoid process, upon the left side. This swelling was tender upon palpation, and an examination of the canal showed a narrowing at the entrance of the meatus, while the canal at the fundus, close to the drum membrane, seemed to be fairly normal. Owing to the local tenderness, the post-aural swelling was deemed indicative of mastoiditis, and the mastoid operation was performed. At operation a perforation through the mastoid cortex was found, close to the root of the zygoma. The operation occupied but ten minutes. The patient rallied well after the operation, but died in diabetic coma three days after its appearance.

In view of the foregoing case, Dr. Dench said he did not regard the high percentage of sugar as having necessarily great significance, any more than its absence from the urine, in the case of a confirmed diabetic, warranted one in giving a favorable prognosis, as the result of any proposed operative procedure. And in the case just cited, although the patient had been a pronounced diabetic, all sugar had disappeared from the urine at the time of the operation, owing to proper diet and proper medication. In spite of this fact, however, the patient died shortly after the operation.

The speaker thought that the insidious manner in which mastoiditis developed in diabetics should be constantly borne in mind. There is very frequently extensive destruction of the bone, with very few general or local symptoms.

In regard to the advisability of making repeated incisions in the drum membrane, in these cases, in the hope of aborting the condition by drainage through the external auditory canal, the speaker was not in favor of this method of procedure. He noticed that Dr. Richards in his paper had incised the drum membrane three times in one case, and four times in another. On general principles, the speaker did not consider this good surgery. He believed that the operator should take his chances of opening the mastoid earlier in these cases, and thus secure perfect drainage, rather than to postpone operation until late, and then find extensive bony destruction. If the operation is performed rapidly, and especially if it is performed early, it seemed to the speaker that the prognosis was not very unfavorable, although, naturally, more unfavorable than in uncomplicated cases.

Dr. KOPETZKY reported a case of chronic otitis media with diabetes, a woman about forty-five years of age, who had two attacks of acute mastoiditis, superimposed upon the chronic suppuration. At the first attack the incision in the drum healed up but her diabetic condition became worse and finally the suppuration recurred. When first seen by Dr. Kopetzky the drum was not visible, suppuration was profuse, and a large polyp was evident in the ear. Examination of the discharge revealed streptococcus with mixed infection. At the time she presented herself for treatment she was suffering from the second acute exacerbation. Bearing in mind the high mortality of such cases, Dr. Kopetzky hesitated to operate, but under local anæsthesia he removed the polyp and curetted the tympanum. The patient no longer submitted to a restraining diet, and her diabetes grew worse, but the acute symptoms have subsided and she is comfortable now; the discharge has decreased very perceptibly. Here then is a case wherein the necessity for operation was avoided by local measures which were successful in spite of the general diabetic condition, and Dr. Kopetzky reported the case to show that these milder measures should be employed before resorting to the major operations on diabetics.

Dr. MCKERNON said that in looking over his case book previous to coming to the meeting he had noted twelve cases

of diabetic mastoids—eight in his own practice and four seen with colleagues, during a period of eleven years.

(1) Boy two and one-half years old, whose urine contained 1.5 per cent. of sugar at the time of operation. Duration of mastoid involvement 8 days. Operation, good recovery, but healing slow. Nearly the same amount of sugar in urine at the time patient was discharged.

(2) Man forty-four years of age, 1.88 per cent. of sugar in urine at time of operation; mastoid involvement three weeks. Operation, good recovery. Healing apparently as rapid as the average case. A little over three quarters of 1 per cent. of sugar in urine at time of discharge.

(3) Woman thirty-six years of age. .82 per cent. of sugar in urine at time of operation. Mastoid involvement two weeks. Operation; healing delayed. Trace of sugar in urine at time of discharge.

(4) Man fifty-six years of age. 1.66 per cent. of sugar in urine at time of operation. Mastoid involvement 10 days. Operation; good recovery; wound delayed but little in healing.

(5) Man fifty-eight years of age. 3.02 per cent. of sugar in urine at time of operation. Mastoid involvement for five weeks. Two attacks of coma prior to operation, one lasting six hours, the other all day—an interval of three days between attacks. Case profoundly septic. Operation on mastoid. Patient rallied slowly from operation, was conscious for three days. On the fourth day coma and death.

(6) Man seventy-five years of age. 2.6 per cent. of sugar in urine at time of operation. Mastoid involved for 12 days. Operation. Partial coma for six hours the day following the operation. After this patient made good recovery but healing was delayed.

(7) Woman thirty-eight years of age. 1.16 per cent. of sugar in urine at time of operation. Mastoid involvement one week. Operation; speedy recovery. Nearly 1 per cent. of sugar in urine at time of discharge.

(8) Woman fifty-two years of age. 4.66 per cent. of sugar in urine at time of operation. Mastoid involvement for five weeks. Patient markedly septic. Had had several attacks of partial coma prior to operation. Operation; coma on

sixth day, and death on eighth. Sugar rapidly increasing after operation.

(9) Man sixty-one years of age. .94 per cent. of sugar in urine at time of operation. Mastoid involved for seven weeks. Operation; good recovery; about the same amount of sugar in urine at time of discharge.

(10) Woman aged forty-four years. Urine contained 2.12 per cent. of sugar at time of operation. Mastoid involvement for three weeks. Operation. Coma on second day lasting between six and eight hours, after which patient made good recovery, although healing was delayed. The amount of sugar in urine steadily diminished after the sixth day, until at time of discharge there was not more than one half of 1 per cent.

(11) Man sixty years of age. 1.88 per cent. of sugar in urine at time of operation. Mastoid involved for two weeks. Operation; patient did well for four days. On fifth day coma, with death on sixth.

(12) Woman sixty years of age. Diabetic for years. Amount of sugar in urine at time of operation not known; had been between 2 per cent. and $3\frac{1}{4}$ per cent. Markedly septic with chills and fluctuations of temperature. Mastoid involved for from six to eight weeks. Operation. Marked improvement for three days. After this, intervals of coma each day, until death in complete coma on the eighth day.

Here were the histories of twelve cases, eight of whom recovered and four died. With such a showing as this Dr. McKernon did not think that such gloomy prognoses should be made. When such cases were seen in consultation, the patient or the family should be told just what condition exists and what are the chances, and let them decide the question of operation or not; but it seemed that when it came to the question of letting the patient go on and die of sepsis, we are justified in attempting to save the patient. In regard to the time element, he thought that this had much to do with the prognosis. In his cases chloroform anæsthesia was given in every instance.

The percentages of sugar in all these cases were taken from twenty-four hour specimens of urine.

Dr. MAYER said that he thought the specialist ought to

take a lesson from the general surgeon in operating upon the diabetic, and consider some of the things the latter is doing. A number of important operations had been performed upon the diabetic in a minute or a minute and a half—such as prostatectomy—under nitrous oxide gas. He merely mentioned this, in order to bring up the question of omitting chloroform anæsthesia and considering some other forms of anæsthesia in order that the patient may be operated, and operated quickly.

Dr. WHITING said that he had been particularly interested in the subject of the evening, for he had seen one of the cases referred to in the paper. Statistics on any subject when gathered from far and near are of course very fallible, but when one can give 10 or 12 cases from his own experience as Dr. McKernon had done, the deductions which he could make were very significant. One point in connection with sugar in the urine had not been mentioned. In dealing with the question of the percentage of sugar—unless perhaps one case which Dr. Meierhof had told of—the amount of the urine had not been accurately given in any of the cases referred to. Dr. Whiting believed that when a patient is seen with 7 per cent. of sugar in the urine and he recovers, it makes a vast difference whether he has 7 per cent. and is passing 40 ounces, or whether he has 7 per cent. and is passing 100 ounces.

He had just seen a patient with diabetes, otitis, and mastoiditis, who had acetone in the urine, diacetic acid, albumin, and casts, as well as the smell of acetone on the breath. There was no doubt about the mastoiditis, but he had advised against operation under the circumstances, unless it was done under local anæsthesia. It was very important to determine the actual amount of sugar as well as the percentage, as it makes a great difference whether a case of recovery is reported with 5 per cent. of sugar, without knowing the actual amount eliminated, or whether you report a recovery with $1\frac{1}{4}$ per cent. of sugar, stating that the amount passed was 150 ounces.

In his own experience he could refer to 11 cases, including the one seen to-day, upon which no operation has yet been done. Of the ten cases before that, the first eight had died. Several of these were seen a number of years ago, and in many

of them no note had been made of the percentage of sugar, acetone, or diacetic acid. Its presence had been noted in only the last three of the eight. Most of these patients had died in diabetic coma from 24 hours up to 5 or 6 days after operation. In the two remaining cases the percentage of sugar was 1.25 and 1.75 per cent. One of these was seen eight weeks ago and the other ten days ago. The one seen eight weeks ago has recovered and his wound has almost completely healed, and the other is living in a good condition, and has no temperature. The sugar in his urine had neither increased nor decreased without operation, still remaining at 1.25 per cent. In neither of these cases was any acetone or diacetic acid found. Dr. Whiting said that, in his experience, the presence of these two elements was associated with a fatal termination in every instance. In one of the cases which he had seen where acetone was present, the operator was not a man of very great experience and was somewhat embarrassed by what he had to do, and also by the fact that he was being urged to get through the operation as speedily as possible; and the operation was unduly prolonged, and the patient died. In the cases upon which he had operated in the last two months the bone portion of the operation was done in less than fifteen minutes, although both were cases of extensive epidural abscess. In one case chloroform was used throughout the anæsthesia, and the patient had made a good recovery; in the other case the anæsthesia was started with chloroform, but the house surgeon reported that he thought the man was dying as he could not feel the pulse, and it was suggested that he discontinue the chloroform and use ether. This was done, and the patient on the tenth day is now in good condition.

Dr. LEDERMAN spoke of one of the patients mentioned in Dr. Meierhof's paper. He had seen the case after the disease had existed about six weeks, and the local picture gave positive evidence of mastoid involvement—*i. e.*, tenderness over the antrum and tip, bulging of post-superior wall of auditory canal and membrana tympani, with constant discharge of pus, and headache over the left side. There was a temperature of 100–102° and the patient was very irritable. He had advised immediate operation, inasmuch as the existing conditions

were indicative, and the percentage of sugar had increased. At the operation the mastoid was found to be extremely diseased, the dura being exposed in the middle fossa. No time was lost in getting the patient off the operating table. Three sutures were introduced in the skin wound. Chloroform anæsthesia was employed. The case progressed nicely for five days, but died in coma on the sixth day. The skin wound had healed and granulations had started to appear in the bone cavity, which had a healthy appearance, showing that there existed considerable resistance in the tissues. Had the operation been performed earlier in the disease, the patient would have better withstood the shock. The percentage of sugar had increased during the course of the ear trouble, and acetone also appeared. No sloughing of the tissues was noticed at the dressing on the fifth day.

Dr. EAGLETON said that his personal experience in the mastoid operation on diabetic patients had been confined to one case, although he knew of two others in the practice of colleagues, both of whom died in coma shortly after the operation. His own patient was seventy-six years of age, and at the time of the operation, the urine contained but little sugar, although his physician stated it had been present off and on for some time. The patient did well but no granulations developed. Seven weeks after the operation the wound, although clean and free from pus, contained no granulations, having the appearance of having been made but a few days prior. During the seventh week, the patient suddenly developed gangrene of the big toe, and died in coma three days later. We have heard this evening of a number of cases containing a large percentage of sugar recovering, and others with a low percentage of sugar dying. Would it not therefore seem reasonable that the percentage of sugar has very little to do with the question? There are a few points, however, to which attention has not been called this evening, which may be of some service to us in making a prognosis in operating on these patients.

First.—We know that diabetes in very young people has a very unfavorable prognosis; nearly all such cases die in diabetic coma. The use of an anæsthetic in such young diabetics must be attended with greater risk than later in life. It would

seem that the ether acting as a toxine with the degeneration in the cells of the liver, which as is now known it always produces, adds the last straw to the already toxic condition from the diabetes, and so precipitates the coma. Both of the cases of death in diabetic coma following mastoid operation that I know of in the practice of colleagues occurred in very young people.

Second.—We know that arterial sclerosis is a frequent complication of diabetes. Its presence not only delays the healing of the wound, but makes general sepsis much more probable.

Third.—A certain proportion of all patients suffering from diabetes has loss of the patellar reflex, the so-called diabetic tabes, showing a degeneration of the ganglionic cells of the cord similar to those found in pernicious anæmia. All these patients so affected stand operation very poorly. Both of Dr. Richards's cases exhibited to-night have no signs of arterial sclerosis that I could discover, and the patellar reflex is very prompt.

Dr. GRUBNING said that in his experience at Mt. Sinai Hospital the patients are generally brought into the hospital in the last stage of the disease. All of these cases of mastoid complicated with diabetes had perforation at the apex; they were cases of the so-called Bezold's mastoid. In his private practice he had lost several cases and had been able to save several. One of these was in a gentleman of sixty-eight with a double mastoiditis. The operation was performed in two stages, first on one side, and then a few days later on the other. The patient recovered. Where the perforation is at the apex and the soft parts are infiltrated and necrotic the disease generally terminates fatally.

Dr. RICHARDS, in closing the discussion of his paper, said that Dr. Dench had called attention to the fact that repeated paracentesis had been done on two of the cases reported. He would like to state that these repeated incisions of the drum were made before the cases came under his observation. He agreed with Dr. Dench that to make repeated incisions of the drum in the presence of sagging postero-superior canal wall and mastoid tenderness is not good surgery.

Dr. Whiting in his remarks had stated that in neither of

the papers read had there been any reference to the total quantity of urine passed in twenty-four hours. In two of the cases he had reported which recovered, he had distinctly stated that one patient was passing three quarts of urine in twenty-four hours, that the urine showed 3 per cent. sugar, and that neither diacetic acid nor acetone was present; that the second case which recovered was passing five quarts of urine in twenty-four hours, specific gravity 1.030, that there was 10 per cent. sugar, and that both diacetic acid and acetone were present.

He had been struck by Dr. McKernon's report of his cases. The Doctor had mentioned the presence and the percentage of sugar in these cases but had made no mention as to whether or not the patients had the general symptoms of diabetes present. The mere presence of sugar in the urine is certainly no indication that the patient is a diabetic. If the presence of sugar in the urine is taken as the basis of the diagnosis we are apt to err.

When on the House Staff of the New York Eye and Ear Infirmary he had been struck by the fact that after the visiting days, when the patients had grapes and fruit brought them by friends, it was common to find sugar in the urine in a comparatively large percentage of the hospital cases.

Dr. MEIERHOF, in closing the discussion on his paper, said that Dr. Whiting was correct in regard to the importance of estimating the amount of sugar as well as the percentage. He had not dwelt upon this point as he had not wished to lay too much stress upon clinical phenomena, but his reports of some of the cases were based upon a twenty-four-hour collection of the urine. A patient may pass a small amount of urine highly concentrated, where a high percentage is indicated; and on the other hand he may pass a large amount with a low percentage, so that the daily excretion of sugar should be ascertained. Clinically we ought to consider diabetes in three classes: one where the symptoms are not severe, and the patients do not lose much weight, but have a chronic condition of diabetes; in another class the disturbance is severe, but these respond to diet and treatment; the third class are the bad cases which do not respond to any treatment

but go on from bad to worse. In this third class of cases a mastoiditis would be a serious matter.

Dr. Gruening's comparison between his hospital and his private cases bears out the assertion that early operation is of the greatest importance. Dr. Meierhof said that he was not alone in making this statement, as all the German operators especially are in favor of operating early and not waiting until the symptoms become severe.

REGULAR MEETING, JANUARY 10, 1907. DR. WENDELL C.
PHILLIPS, CHAIRMAN.

Papers

The present status of the question as to progressive spongification of the labyrinthine capsule. By NORVAL H. PIERCE, M.D., of Chicago. (Published in full on pages 44-61 of this number.)

Dr. DENCH said that he had greatly enjoyed the masterly way in which the subject had been presented by the writer of the paper. The subject is one which is attracting more and more attention in the otological world. The chief difficulty is in making a correct diagnosis, but he sometimes wondered when he was quite sure that he had reached a correct diagnosis whether or not he had done a good thing for the patient. The condition is so absolutely hopeless, and the mental attitude of persons afflicted with progressive hardness of hearing is so hopeless, that it was questionable whether it was wise to tell them the whole truth. It is better if we can hold out even a little hope to them, and we should always remember that even the best and most careful sometimes make a wrong diagnosis. He had seen a number of cases where he had given a hopeless prognosis, but had continued treatment at the patients' urgent request, and found that he had been wrong, although he had based his conclusion upon the "triad." While in a good many cases one can make the correct diagnosis, it is well not to be too positive. When we come to analyze the evidences referred to by Dr. Pierce—the elevation of the lower tone limit, the increase in bone-conduction, the preservation of the upper tone limit—we must remember that these three reactions are found in middle-ear conditions pure and simple, and many cases of localized

congestion about the oval window will give exactly these reactions, and will have pronounced deafness—all of which will disappear under a little local treatment. We can only be sure of a diagnosis after prolonged observation and careful differentiation. It is not absolutely essential to know whether there is a spongification or inflammation of the labyrinthine capsule in order to make a prognosis. In many of these cases where the disease affects the inner surface of the stapes and invades the lower turn of the cochlea there is interference with the upper tone limit. When Dr. Pierce says that the upper tone limit may not be lower than 4 of the Galton whistle and still be normal, that was not in accord with his own observation of the normal upper-tone limit. In most ears he had found the normal upper limit to be 1 to $1\frac{1}{2}$. Anything lower than 2 is decidedly pathological. When he finds 2, $2\frac{1}{2}$, 3, 4, he always concludes that there is some lesion of the labyrinth.

As to treatment, when a spongification exists, nothing can be accomplished by local treatment excepting during an acute catarrhal inflammation of the upper air tract. The patients should be kept in good condition so that they will have as few acute attacks as possible, and when these do occur they should be relieved promptly, which will help the patient, but for the relief of the bone lesion nothing can be done, though perhaps if the stapes were removed early there might be a chance of improving or limiting the disease in cases where the disease began in the region of the stapes, and he would be tempted to try it. In a certain proportion of cases pilocarpin is very helpful. One patient who has been suffering from this condition for nearly three years took pilocarpin for a year and a half before receiving any special benefit, but in the last five or six months he has improved very decidedly.

Dr. BRYANT said that the difficulties of diagnosis had been emphasized. His opinion was that, except in very typical cases, the diagnosis was always in doubt. When there was a clear picture of a normal middle ear and tube, as described by Dr. Pierce, with a diminution of air-conduction in proportion to the bone-conduction, the diagnosis was positive, but not otherwise. As to the treatment of such cases, general hygiene is the chief factor. Most of the patients are women,

and the commencement of the trouble has generally been attributed to some nervous strain, general disease, or disturbance in sexual function. Many of them date from the first menstruation or pregnancy. In the cases that had come under his observation, the improvement of the general hygiene, menstrual disturbances, and especially relief of nervous strain had given the best results.

Dr. HASKIN said that he had understood Dr. Pierce to say that the prognosis was not always unfavorable, and that many of these cases had been known to stop suddenly and without bad result to the patient. Many of them go on to a certain point and then remain stationary indefinitely. It was of the greatest importance to make a complete and careful diagnosis, in order to reassure the patients and give them all the help possible, or at least keep them in a happier and more hopeful frame of mind.

Dr. DUEL said that in a large majority of cases a fairly positive diagnosis could be made, but in others it was practically impossible. He agreed with Dr. Pierce that when a positive diagnosis of otosclerosis was established, the patient should be told the futility of all local treatment, but should be given general directions and kept under observation. He thought that Dr. Dench had been mistaken in thinking Dr. Pierce had said that 4.0 was the normal upper-tone limit of Edelmann's whistle. This was not the impression that he had received from the paper. He had found, as had Dr. Dench, that the usual limit was from 1.0 to 1.5 with the Edelmann whistle. If both ears gave the upper tone limit from 0.8 to 1.5 he put that as the normal upper-tone limit for the patient, but if there was a difference he considered it as a defect on the one side. A point which had always interested him was that in a certain number of cases in which there was a very evident absolute increase of bone-conduction, not only was there a distinct raising of the lower tone limit, but also a distinct lowering of the upper tone limit—in some cases up to 10.0 Galton. He had come to think that in these cases the distinct lowering of the upper tone and raising of the lower tone was due to a fixation of the stapes. He had not seen this point mentioned, but it seemed to him that there was no other way to account for the fact.

Dr. PHILLIPS said that the diagnosis of non-purulent ear diseases was always important, and even when no marked improvement in hearing or even relief from tinnitus could be effected, it was far better for a reputable otologist to have the watchcare of the patient than to have him consult quacks, and to this he will usually consent if a plain statement of facts is given, with an explanation of the importance of careful hygiene and attention to general health. He told of a patient now under his care who had been the rounds of many doctors. Her chief symptom was tinnitus, and when after a careful test of various remedies and treatments no improvement was noted, the condition was explained to her and she was told that so long as her hearing was not diminishing it was much better for her to endure the tinnitus and make no further efforts after treatment. She now reports once a month and is carefully tested, and her general physical condition looked after. The tinnitus remains about the same, the functional tests are the same, and the disease is *in statu quo*, so far as symptoms are concerned. Mechanical forms of treatment are generally harmful, and aural massage, the use of the Siegel otoscope, catheterization, etc., are all harmful and usually increase the symptoms of the disease.

In closing the discussion, Dr. PIERCE said that Dr. Haskin had replied to Dr. Dench's remarks in regard to the progressiveness of this disease. It is not by any means a progressive deafness in all cases; it may come to an end at any time, or the changes in audition may not be apparent for ten, fifteen, or even twenty years; it is rapidly progressive in only a very few cases. This phase of the question was considered in the paper.

The triad—increase of osseous conduction for low sounds, the elevation of the low tones, the negative Rinne—may all be found in cases of catarrhal deafness. It is only when we find the absence of catarrhal symptoms—so-called—in the tube, and when we find a patulous and a dry tube, when we find an entirely normal membrane, and Bezold's triad, that we are inevitably right in making a diagnosis of spongification of the capsule with the fixation of the stapes. Bezold's triad may be present in any condition of suppurative inflammation, where the ossicles, with the exception of the stapes,

are absent. If the stapes is ankylosed there will be an elevation of the low tone, and a long osseous conduction of the low tone, and a negative Rinne, but the question of diagnosis as to the cause of stapes ankylosis does not come in question in these cases. We may have the same symptoms in temporary stapes ankylosis of young children, for instance, where there is complete occlusion of the Eustachian tube and the air of the tympanic cavity has been absorbed, and the pressure in the external ear is so great as to force the stapes in the fenestra ovalis; but the question of spongification of the capsule does not come into consideration at all.

There are cases of combined inflammatory conditions of the middle ear and stapes ankylosis which are difficult to diagnose, and these must be observed for some time before we can make a proper diagnosis. There are cases of nerve deafness and stapes ankylosis which are difficult to differentiate—they may require one, two, three visits, but he had endeavored to mark out the way in which a differential diagnosis can be reached.

Regarding the upper tone limit, Dr. Dench had misunderstood him and Dr. Duel was right. He had not said that 4 was the normal tone limit in Bezold-Edelmann whistle, but that anything below this should arouse suspicion at once of nerve involvement, and it is in these cases of spongification where there is a diminished upper-tone limit up to 4 or islands of defect below this in Edelmann's whistle that we have the worst prognosis. Another practical fact is that when there are a diminished upper-tone limit and the characteristic "peach-blow" color of the membrane, the case has a most serious prognosis. Fixation of the stapes itself does not necessarily occasion this reduction of the upper tone limit. It is the process which is going on in the labyrinthine capsule which causes these islands of defection and decrease in the upper tone limit, and it is one of the points which Bezold affirms as additional evidence of Helmholtz's theory of the resonator function of these little crypts between each lamella spiralis. The resonator function of the cochlea is reduced or destroyed by the spongification of a normally hard labyrinthine capsule.

REGULAR MEETING, FEBRUARY 8, 1907, DR. WENDELL C.
PHILLIPS IN THE CHAIR.

Case of advanced granular nephritis, with symptoms simulating those of brain tumor. Reported by Dr. BOND STOW.

Dr. BOND STOW said that he had not come to the meeting with any idea whatsoever of reporting this case, but had been speaking of it to the Chairman (just before the meeting was called to order) who had asked him to present it to the Section as being especially pertinent to the subject of the evening.

On Saturday last he had had the privilege of performing an autopsy in a case which he had seen twice before death, and where he had made a very careful analysis of the symptoms and ventured the diagnosis of brain tumor, probably located in the cerebellum. This diagnosis was based on the symptoms that for several weeks the patient had suffered from: persistent vomiting, cerebellar ataxia, decided vertigo, interference with respiration, irregular and rapid pulse, some defect in hearing in that he could not accurately distinguish a watch ticking at a distance of $1\frac{1}{2}$ to 2 feet. The last time the patient was examined, the mentality was low, and he spoke with great difficulty; he could understand what was said to him only after considerable thinking, and then replied slowly and hesitatingly. There was also difficulty in swallowing, in that on taking a swallow of water he would hold it in his mouth for sometime before swallowing it, refusing to do so for fear of choking, and at times there was more or less of choking when swallowing. There was no edema anywhere throughout the body, the skin being dry and normal in every respect, and there was nothing in the color of the skin that would lead one to suspect kidney trouble. The first consideration in establishing any diagnosis of occult nature is the condition of the urine, and one should never venture upon a diagnosis without information in this respect. In this instance the interne assured him that there was no albumin, no sugar, the quantity was about normal, a normal amount of urea, and the specific gravity 1.025. With such findings, and the total absence of any cachexia or appearance peculiar to kidney conditions, he excluded the

kidney affection and devoted himself to the cerebral symptoms. The ophthalmologist reported choked disk in both eyes, and his own ophthalmoscopic examination showed that the vessels of the eye were decidedly engorged. With these conditions he could make no other diagnosis than that of intracranial pressure, probably due to a tumor in the cerebellum. One other symptom was that the patient insisted upon lying on the right side.

Naturally he was very much interested in the case, and when the report came to him on Saturday evening, with permission for an autopsy, he went at once and performed the same within six hours after death. To his surprise, there was no tumor whatever to be found in the brain; nothing but a hypostatic congestion oedema, and intracranial pressure due to an increase of fluid in the lateral and third ventricles. There was marked hypertrophy of the left ventricle of the heart. There were no valvular lesions. The kidneys had undergone extensive granular changes and were highly sclerotic. It was difficult to conceive of any one living so long with kidneys in such a condition. Dr. Stow thought his diagnosis had failed because of the urine analysis report, and that if a more careful analysis had been made albumin would have been found as well as casts, and with the other indications a correct diagnosis would have been established, showing that uræmia was present. He spoke of this case with honesty and frankness, and though he had been mistaken in his diagnosis he felt that under the circumstances the conclusion he had reached was justifiable, for being guaranteed that the urine was normal there was nothing in the appearance of the man to indicate disease of the kidneys. He spoke of this case in order to particularly impress upon the profession present the strenuous need of knowing *for yourself* in every case of importance the exact condition of the urine. Internes in our hospitals to whom the work of urine-analysis is relegated often grow hasty and careless in this work and frequently totally fail to grasp its vital importance as the corner-stone in any well-laid diagnosis.

Dr. PHILLIPS said that this was certainly a most interesting and instructive case and should appeal with force to all who are interested in the question of cerebral complications:

in connection with otitis media. Within the past month he himself had had two experiences which might serve to emphasize Dr. Stow's remarks in connection with this case. In one instance the patient had an extreme vertigo with a chronic discharge from the ear, and all the symptoms of an acute mastoiditis, and other symptoms pointing to the presence of a cerebellar abscess. He decided to operate, but before doing so a urinary analysis was made, with negative results. A radical operation was performed, occupying about one and three-quarter hours, as there seemed to be no need for haste. This was on a Sunday. The following day a more complete test was made of the urine, and the report was that it showed 11 per cent. of sugar—the highest percentage he had ever seen in any case upon which he had operated, and yet the patient went successfully through the operation, and upon being put upon a diabetic diet the symptoms all subsided and she eventually recovered. This is simply another instance to show the importance of a careful examination of the urine. In another case the patient had a purulent discharge from the ear, lasting for a week or ten days. This happened over a year ago. In three months he had vertigo, which gradually increased until it became very extreme. There was a loss of bone and aërial conduction in the ear that had been discharging, and with all these symptoms there was a partial paralysis, especially of the muscles over the trigeminus. His vertigo was so severe that at times he was unable to perform his ordinary farm work. There was severe pain about the angle of the eye on the affected side, radiating into the ear and into the left side of the head. There was a marked papillitis, with some hemorrhage, and some engorgement of the vessels, more marked in the left eye than in the right. With all these symptoms there was no involvement of the kidneys so far as could be determined. Dr. Richards had also seen the case, and agreed with Dr. Phillips that there is probably present some form of cerebellar tumor. There is no history of syphilis, either hereditary or acquired, and the symptoms point to a cerebellar tumor rather than to a cerebellar abscess, as there is no indication whatever of any absorption or infection. If any indication of kidney lesion could be found, he would be inclined to consider the symptoms

due to that cause. The patient has been put upon large doses of iodide of potash for a few days, and the symptoms have improved somewhat, though the amelioration is not marked. Such cases are of great interest to the otologist, for there is much yet to be learned in regard to the intracranial complications of middle-ear diseases.

Our present faulty methods of brain localization in lesions complicating aural diseases. By S. MACCUE SMITH, M.D., Philadelphia. (Published in full on pp. 62-78 of this issue.)

Discussion.

Dr. SACHS said that he was not a little comforted in knowing that, after all, our methods of localizing brain lesions are not particularly faulty. So far as he could infer from Dr. Smith's able paper the otologists and neurologists do not encounter greater difficulty in localizing these lesions than do medical men generally in almost any attempt to diagnose mysterious and deep-seated diseases. That we do not always succeed is natural. All we can do is to be guided by such data as have been established by experimentation and the study of cases at the bedside, and if we succeed in the vast majority of cases we must be satisfied. If in say 10 per cent. of the cases we err, we simply acknowledge that we are human. He could not feel that diagnostic methods as they have been taught and adopted are faulty, though they may not be perfect. The questions that the otologist encounters are relatively easy. The matter of diagnosing a cerebral or a cerebellar abscess when there is a preceding history of ear disease is not so difficult; but in the absence of traumatism or previous ear disease, or other distinct etiological factor it is sometimes very difficult indeed. In abscess, of course, the general train of symptoms is always present: vertigo, headache, stupor, coma, change in the pulse rate, the occasional presence of optic neuritis—although that is sometimes misleading. In reference to the diagnosis of such abscesses as are met with in connection with otitic diseases, there is one symptom so often present that he was astonished it was not cited as almost positive proof of cerebellar involvement. This is a very slight weakness of the rectus externus, which of course is due to involvement of the abducens, which is

almost invariably compressed. This gives rise to what appears to be nystagmus, due to greater pull of the inner muscles. He had not seen a case in which cerebellar lesion of any sort was present, in which there was not at least a slight weakness of the rectus externus; and if this symptom is present with a diminution of the reflexes—of the knee jerks in particular—and the cerebellar ataxia, where the patient even in bed may be so dizzy that he cannot turn his head without unpleasant symptoms that point to the cerebellum, there is very little doubt as to the location of the lesion.

With reference to other abscesses, there is a symptom in connection with temporo-sphenoidal abscesses, especially if the disease is on the left side, which is not looked for so carefully as it should be. With this in view, he had gone over the reports of temporo-sphenoidal abscesses, particularly those made by otologists and neurologists, and it is a fact that sensory aphasia, particularly word-deafness, is not recorded so frequently as it must have been present. This is not a symptom that obtrudes itself—it has to be looked for. The patients appear to speak normally and have, as a rule, motor speech intact. They can express themselves clearly, and unless you interrogate them and put questions as to whether they understand particulars you will fail to elicit a partial sensory aphasia which is one of the most important symptoms. Dr. Sachs claimed that there could be no temporo-sphenoidal abscess of any extent in the left half of the brain without this symptom, and yet the number of cases in which it is reported are very few. Some time since he had reported a case where the woman gave a history similar to the one reported by Dr. Smith this evening. She had a chronic discharge of the ear for years, which then ceased, and was well until twenty-four hours before he saw her. She was then in a stuporous condition and was supposed to be developing meningitis. She had no rise of temperature, and though slightly stuporous could get out of bed, and when interrogated appeared to be silly and more stuporous than her general condition warranted. She could walk around and acted rationally, but would give silly and irrelevant answers. On closer questioning it was found that she had a distinct sensory aphasia, and no other localizing symptoms. If that had been

reported as simply a case with general cerebral symptoms and a little stupor, the sensory aphasia would have been overlooked; but as this was suspected the woman was asked to write, and it was found that she had lost the knowledge and power to write, and the conclusion was reached that there were not only a sensory aphasia and a temporo-sphenoidal abscess, but that the abscess was deep and interfered with fibres that come down from the vicinity of the motor area on the same side of the brain. When the brain was exposed the surface was entirely normal, and the surgeon hesitated to go in, but upon being urged he went in an inch and a half or more and evacuated a large abscess. The woman recovered in two weeks, and has been well ever since. In this instance, unless the sensory aphasia had been especially looked for it would have entirely escaped notice, and Dr. Sachs said that he regarded this as by all odds the most valuable symptom of this condition.

There should therefore be no difficulty in localizing a temporo-sphenoidal or cerebellar abscess, or in differentiating between the two, though we may occasionally go wrong. He then cited a case occurring a short time ago in which he could not determine at first whether the patient was suffering from nephritis or from an intracranial neoplasm. The diagnosis could not be made until secondary deposits appeared on the skin, and then it was evident that there was a neoplasm. The patient finally died from general carcinomatosis. All we can do in such cases is to use the knowledge we have and make the best of it.

Dr. SACHS said that he was much more troubled about the proper treatment of a brain abscess than about its localization. He could not understand why when a temporo-sphenoidal abscess was suspected the surgeon should not go in over the mastoid region and lay open a large area of the temporo-sphenoidal region, and then make either several punctures or a clean-cut incision through a good part of the temporal lobe, which would heal readily, and if an abscess were found it could be cleaned out and drained properly. The question of success lies in the proper surgical drainage of the abscess. In temporo-sphenoidal abscesses the question of drainage is much easier than in parietal abscesses, which are, of course,

less frequently encountered. The parietal abscess cannot be drained easily without danger to important tissues. The question that the otologist should especially consider is the after-treatment, the proper principle of drainage. In temporo-sphenoidal abscesses the incision should be made after a thorough exposure of the temporo-sphenoidal lobe, keeping somewhat away from the site of infection. So far as we know, the area for the auditory centre is on the border of the first convolution. Go up as high as possible and make an incision there, keeping away from the site of infection. There is no reason why the surgeon should not be bold in this matter. A simple incision if done with proper precautions does no harm. Much more harm is done by operating in the dark and encouraging infection in that way. A clean-cut incision through a large part of the temporo-sphenoidal lobe will do no harm, but it is for the surgeon to decide whether he shall make one or more incisions. The question is whether it is best to drain through a sinus which already exists, rather than to expose an entirely new surface of the brain. Personally he preferred the latter method, though he was open to conviction. He would like to have Dr. Smith's opinion on this point, for it is one of great importance and concerning which there is great diversity of opinion.

Dr. PHILLIPS asked Dr. Sachs to explain how he would bring out the symptoms of sensory aphasia—what variety of questioning he would employ.

Dr. SACHS replied that before answering this he would like to say one word more in regard to the question of drainage. During the past ten years he had had opportunities of seeing many otologists operate, and as the result of his observation and experience, if there was any one method which he considered very very bad it was that of draining through the attic, or utilizing in any way the old source of infection. Much better results are obtained by disregarding the ear altogether—of course performing the necessary internal manipulation, but considering the brain and brain operation as a thing entirely apart. In the case of the patient to which he had referred, he had insisted upon this point, and the surgeon was very willing to attempt it; and the result was very brilliant, for the woman recovered in two weeks, which was

a remarkable result for an abscess of that size—it evacuated half an ounce of pus or more. He was convinced that the good result was largely due to the fact that the brain abscess was treated independently of its otitic origin, and he decidedly favored this method of operating, so far as he was entitled to make any suggestion.

The question of examining for sensory aphasia was very simple. It depends simply upon observing whether a person understands speech. This can be determined by asking the patient to do certain things and noting whether they are done, being careful not to use gestures,—not use the hands or eyes to suggest the action, but simply speak. Ask the patient to do a certain thing which he is not accustomed to doing. For instance, to touch the right ear with the left hand, or show the teeth, or close the eyes, or go around the room and touch the window-sill—anything which he is not accustomed to doing, and observe if he understands what is said. Patients often have absolutely normal speech, and do not themselves realize that there is any defect. Of course you can soon discover what the defect is and how great it is.

Dr. ARWOOD said that he had greatly enjoyed Dr. Smith's able and interesting paper, and he agreed with Dr. Sachs that the localization of brain lesions had become much simplified owing to the advance that has been made in the knowledge of brain functions, and of the cortical and sub-cortical regions. He had nothing to add to what had been said, but merely wished to call attention to the fact that it has recently been found that the X-ray is of considerable value in localizing abscesses as well as hemorrhages and growths in these regions.

Dr. BOND STOW said that he did not understand how and wherein the X-ray would reveal an abscess. He could understand how it might be useful in case of a tumor, but not in that of an abscess, which would simulate more or less the same substance or density as the brain itself.

Dr. ARWOOD replied that he had no personal experience with the X-ray in the diagnosis of brain abscess, but that Phaler states that such use is practical in the early stage, at which time its use should be especially desirable.

Dr. KENEFICK said that he felt very grateful to Dr. Smith for his valuable paper, and had no criticism to pass upon it,

but he took issue with Dr. Sachs's advice in regard to opening a temporo-sphenoidal abscess by a high incision. During the past ten years at the New York Eye and Ear Infirmary he had seen no temporo-sphenoidal abscess opened in any other way than by the removal of the squama through the usual incision. In the great majority of cases the abscess cavity lies in very close proximity to the carious bone through which the process has penetrated, and it would seem that the most logical place to open it would be as low down as possible, and not high up as Dr. Sachs advises. He felt that most otologists would agree with him that the place to open a temporo-sphenoidal abscess is as near as possible to the place of entrance and, of course, through the squama. Such a case as that reported by Dr. Smith was very unusual.

Dr. MYLES expressed his high appreciation of Dr. Smith's paper, and said that he felt the Section was also indebted to Dr. Sachs. He had long felt that we needed more light upon this subject. Ten or twelve years ago he had reported a case of temporo-sphenoidal abscess in a child which was published in the *Annual Transactions* of the American Otolological Society. The abscess was a very extensive one—an inch or more in diameter, and communicated with the roof of the attic, its lower border evidently resting upon it. When the bone was broken through, the pus gushed out and continued to discharge for some time. The child recovered, but showed some mental hebetude for a year. He thought that the recovery was due to the fact that he had not disturbed the phagocytic walls. Dr. Macewen speaks of the creating a new source of infection by disturbing this wall. Instruction concerning definite localization of the abscess, and definite procedure in regard to drainage, is received with keen desire for more.

Dr. H. KNAPP thought that the most rational way to detect an abscess in the process of the disease is to follow the abscess in its origin and growth. It is very seldom that an uncomplicated otitis produces an abscess. We know by clinical experience that three-fourths of the abscesses occur in the temporal lobe; furthermore, we know that the caries in the tympano-mastoid cavities breaks through the bony roof of the tympanum and the roof of the mastoid antrum. The pus extends to the neighboring layers and also through the roof

of the antrum. From either of these passages an abscess may develop, and clinical experience has taught us that the abscess is almost always in close proximity to the perforation. As there is no geometrical relation, we have to follow the passages of the suppuration through the tegmen tympani and the tegmen antri. We know also that the distance from the cranial surfaces of these roofs is only 3-5mm and mostly we can penetrate along through these fistulæ into the abscess. Following the process of the destruction, we are sure of the location, and can enter the pus cavity. This is certainly the best way to discover the collection of pus, and it appears natural to enlarge the fistulæ and let the pus escape through them. The treatment should follow the same lines. No more direct drainage can be imagined. This seems all right; the patient feels relieved at once, and for a few days improves in every way, but soon begins to show another picture and grave intracranial symptoms appear, followed by death. What is the cause, as everything seemed to have been going so well? Clinical experience again comes in with her stubborn judgment. The opening has been insufficient. Other parts of the brain have been invaded, and the patient dies of purulent inflammation. The rational method has had some success on its side, but it has abutted upon the well-known experience. The worst fault in opening a brain abscess is an insufficient opening. Bergmann, Professor of Surgery in the Berlin University, who has written an excellent treatise on brain surgery, follows the method we have found so rational, and goes just so far as we do in finding the abscess; but then he removes the skull above the ear and goes boldly through the squama, and the bottom of the middle cranial fossa, and maintains a sufficient aperture to observe the disease until the pus and fever have disappeared.

Dr. OPPENHEIMER said that a rather unique case had recently come under his observation which illustrated the difficulty of making a diagnosis of temporo-sphenoidal abscess, and a point which proved to be of great value in aiding in establishing the diagnosis was the alteration in the pulse rate. A little girl of five had an acute double otitis which required a double mastoid operation, involving exposure of the dura over the region of the attic. The child made a prompt

recovery, but four months afterward developed some intestinal symptoms for which she was treated. Following the intestinal attacks, the general condition of the child remained poor. There was no pronounced condition, but she complained constantly of being tired. This state of affairs lasted for four months, making in all eight months after the period of operation. The blood examination showed a slight degree of anæmia, the temperature was about 100° F., never quite reaching normal. Optic examination proved negative, and there was no evidence of splenic enlargement. The blood examination showed no malarial infection. The child complained occasionally of headaches. Dr. Manges and Dr. Cohn, however, discovered certain alterations in the pulse rate. The pulse, which had been at 90, would drop suddenly to 60 and even to 55. This condition lasted for several weeks, and Dr. Oppenheimer was then asked to examine the child again. He found nothing to lead him to suspect intracranial lesion, but Dr. Manges felt that there were some indications of intracranial pressure and it was decided to open the mastoid and again expose the dura. The original exposure of the dura had been rather large and it was found to have prolapsed into the cavity which had been the mastoid antrum. Incision was made an inch above the auditory canal into the dura, which seemed to be normal, and this was followed by a gush of pus—about an ounce and a half being evacuated. The encephaloscope was introduced and the marginal portions of the cavity were inspected, and revealed what seemed to be a distinct limiting membrane. At the time of the first dressing a gush of rather serous fluid took place in this cavity, which was probably due to a little over-manipulation, and it was realized that a connection had been established between the ventricles. The patient developed a meningitis and died. Dr. Oppenheimer said that he had related the history of this case simply to show the value of the pulse rate as being suspicious of intracranial pressure and aiding in this case in the diagnosis of brain abscess.

Dr. MACCUEEN SMITH, in closing the discussion, said that his chief object in presenting a paper on this subject was the hope of eliciting a discussion, and he had been much interested in what had been said this evening, especially in the points that Dr. Sachs had made in regard to the paralysis

of the rectus externus and the sensory aphasia, as indicating abscesses of the temporo-sphenoidal or cerebellar regions. At the same time, and notwithstanding the experiments which have enabled us to so often localize these abscesses accurately, there remain many cases which we are absolutely unable to localize. He had probably seen more of these failures than many of his New York friends, and now recalled one notable case.

The wife of a colleague from a southern State was brought to Jefferson Medical College Hospital for consultation, and was examined by some of the leading authorities, both medical and surgical, of Philadelphia. The case was studied for one or two weeks, and subsequently two operations were performed, but the abscess was not found, and she was finally taken home no better than when she arrived. A little later she died, and a post-mortem examination revealed an abscess in a part of the brain which had not been suspected, on account of the entire absence of localizing symptoms.

In regard to the point of opening, Dr. MacCuen Smith could not but feel that if an opening in the roof or antrum were found during the operation, it was good surgical procedure to favor drainage through the opening which already exists. He had seen some cases which were drained by enlarging the carious opening through the tympanic roof, with but one death in probably eight cases. He agreed with Dr. Sachs in regard to the importance of free incision and proper after-treatment. One is not so apt to have, or to induce, septic foci by incision as by puncture. For exploratory purposes, Dr. MacCuen Smith uses Dr. Chevalier Jackson's forceps, which does less damage to the brain than a probe. This is an excellent little instrument for locating pus, but you must make a free incision if you wish to secure good results. In a joint case which he had recently attended with a general surgeon, there was an opening through the roof and also one through the cortex above the ear. This case has been very ill, but is now rapidly recovering.

He also called special attention to the satellite abscesses. He had seen cases where there were secondary abscesses arising from the parent pus formation, and he believed that where death occurred it was chiefly due to the infection made general by these satellite abscess formations.

REPORT ON THE PROGRESS IN OTOLOGY DURING THE FOURTH QUARTER OF THE YEAR 1905.

BY PROF. ARTHUR HARTMANN, BERLIN.

Translated by Dr. ARNOLD KNAPP.

NERVOUS APPARATUS—(Concluded).

341. WANNER. A case of bilateral deafness for speech after injury to the skull. *Monatsschr. für Unfallheilkunde und Invalidenwesen*, No. 9, 1905.

342. GRAY. The pathological condition found in a subject who had suffered from deafness during life. *Lancet*, August, 19 1905.

343. MCBRIDE. A case of sudden and simultaneous onset of cephalic bruit and deafness. *Trans. Otological Society*, United Kingdom, 1905.

344. HORSLEY and RUSSELL. Vertigo, its pathology and treatment. *Trans. Otological Society*, United Kingdom, 1905.

345. LAKE. Case of removal of part of the cochlea, external wall of vestibule, and of the external semicircular canal for relief of tinnitus and vertigo. *Trans. Otological Society*, United Kingdom, 1905.

346. STEWART. On the membranous labyrinths of certain sharks. *Linnean Society's Journal*, February, 1906.

341. WANNER. *A case of bilateral deafness for speech after injury to the skull.*

Wanner describes the fate of a man who was injured in a coal mine and in addition to other injuries suffered from a severe lesion of both ears which led to deafness. In the various examinations of the case, an examination of the ear was not made, and no notice was taken of the progressive deafness. At one examination it was noted that the injured man was also deaf but that this deafness was in no relation to the injury.

Twelve years after the injury the existing deafness was referred to the early injury. This view was opposed by an

authority on traumatic neurosis until a careful examination in Bezold's clinic showed the correctness of this diagnosis.

The author pleads for examination of the ear by an aurist in all cases where the patient complains of a disturbance of hearing.

HOELSCHER.

342. GRAY, ALBERT A. *The pathological condition found in a subject who had suffered from deafness during life.*

At a meeting of the British Medical Association held on July 26, 1905, Gray recorded the pathological condition found by him in an individual aged seventy-one years, who for seventeen years had suffered from almost absolute deafness and very severe tinnitus. Death occurred from cancer of the uterus.

The bones of the skull were remarkably soft. The greater part of the temporal bones were also soft in character, and the dense ivory-like capsule of the labyrinth was much reduced in thickness.

The mucous membrane of the tympanum and Eustachian tube was normal throughout. The malleo-incudal joint was ankylosed on the right side but not on the left. On both sides the stapes was completely ankylosed in the oval window, the ankylosis being bony throughout. In the left membranous labyrinth the changes in the bony capsule were found to have produced distortion in the two limbs of the posterior canal by encroaching on its lumen.

The cochlear branch of the auditory nerve was atrophied, at least in the upper two turns of the cochlea. The ligamentum spirale appeared to be of a less dense nature than normal, though this may have been due to old age and not to disease. In the right membranous labyrinth there was found to be no actual distortion. The ligamentum spirale was atrophied, as was also the cochlear branch of the nerve. There were two masses of calcareous deposit; one in the common limb of the posterior and superior canals and the other in the posterior limb of the horizontal canal.

ARTHUR CHEATLE.

343. MCBRIDE, P. *A case of sudden and simultaneous onset of cephalic bruit and deafness.*

A man aged fifty-seven years suddenly became very deaf in the right ear with buzzing tinnitus and without giddiness. The

bone conduction remained. A passing bruit could be heard with a stethoscope placed behind the ear. McBride suggested that it might be due to the sudden occurrence of an aneurismal dilatation of a large vessel so modifying the circulation in the right cochlea.

ARTHUR CHEATLE.

344. HORSLEY, Sir VICTOR, and RUSSELL, RISIEN. *Vertigo, its pathology and treatment.*

The papers and the subsequent discussion require to be read in full.

ARTHUR CHEATLE.

345. LAKE, R. *Case of removal of part of the cochlea, external wall of vestibule, and of the external semicircular canal for relief of tinnitus and vertigo.*

The patient was a woman, aged twenty-six years, who suffered from tinnitus, which prevented sleep; and vertigo, with extreme deafness. After performing the radical operation, Lake removed the external semicircular canal, the outer wall of the vestibule, and cleared out the cochlea as far as possible after opening it. The tinnitus returned slightly on the fourteenth day. After the operation there was no jactitation of the eyes or vertigo; the patient being able to stand up, to turn around either way with the eyes shut, and to pick up an object on the floor on the fifth day after the operation.

ARTHUR CHEATLE.

346. STEWART, CHARLES. *On the membranous labyrinths of certain sharks.*

Stewart has had the opportunity of examining the labyrinths of certain sharks which have not been dealt with by Retzius:

Notidanus friseus.

Fam. Notidanidæ.

Læmargus borealis.

Fam. Spinacidæ.

Lamna cornubica.

Fam. Lamnidæ.

Alopecias vulpes.

Fam. Lamnidæ.

Carcharias lamia.

Fam. Carchariidæ.

The article is illustrated.

ARTHUR CHEATLE.

OTHER EAR AFFECTIONS.

347. STEWART. *A case of non-development of the mastoid process. Brain, 1904.*

348. YEARSLEY. A case of "blue membrane." *The Lancet*, February 10, 1905.

349. CHEATLE. A membranous septum in the interior of the lateral sinus. *Trans. Otolological Society*, United Kingdom, 1905.

350. PINDER. A vascular intra-tympanic growth, probably an aneurism by anastomosis. *Trans. Otolological Society*, United Kingdom, 1905.

351. MILLIGAN. A case of otitis media hæmorrhagica in a male patient suffering from granular kidney and diabetes. *Trans. Otolological Society*, United Kingdom, 1905.

352. BRONNER. Notes on a case of severe vertigo, due to aspergillus of the external auditory meatus. *Proc. Otolological Society*, United Kingdom, December 4, 1905.

347. STEWART, PURVES. *A case of non-development of the mastoid process.*

Purves Stewart relates the case of a man in whom the neck muscles on one side were congenitally absent with non-development of the mastoid process.

ARTHUR CHEATLE.

348. YEARSLEY, MACLEOD. *A case of "blue membrane."*

Yearsley showed a boy aged seventeen at the Otolological Society in whom the left membrane was a dark slate-blue color. There was some degree of deafness, but no cause for the condition could be ascertained. The right membrane was normal.

ARTHUR CHEATLE.

349. CHEATLE, ARTHUR. *A membranous septum in the interior of the lateral sinus.*

The septum was $\frac{1}{2}$ an inch in length and placed vertically, dividing the sinus into two channels.

From a man aged forty years.

ARTHUR CHEATLE.

350. PINDER, T. H. *A vascular intra-tympanic growth, probably an aneurism by anastomosis.*

A woman aged sixty-four years became slightly deaf with constant tinnitus in the right ear only. Later giddiness and clonic spasm of face and neck with increased pulsating roaring tinnitus. A loud systolic murmur heard over right mastoid, unaltered by moderate compression of carotid.

The membrane retaining its polish was injected; the posterior segment bulged. The outline of the malleus was just

visible but the umbo appeared as a bright yellow dot in a blood-red field.

ARTHUR CHEATLE.

351. MILLIGAN, WM. *A case of otitis media hæmorrhagica in a male patient suffering from granular kidney and diabetes.*

Sudden deafness without pain, but accompanied by a dull heavy feeling in the right ear. Middle ear seen to be nearly full of dark reddish exudate. A hemorrhage into retina also occurred.

ARTHUR CHEATLE.

352. BRONNER, ADOLPH. *Notes on a case of severe vertigo, due to aspergillus of the external auditory meatus.*

The symptoms were slight increasing deafness of the right ear, with intense tickling for two or three months and attacks of severe vertigo and occasional violent sickness. Recovery was complete after treatment.

ARTHUR CHEATLE.

NOSE AND NASO-PHARYNX.

a.—ACCESSORY SINUSES.

353. TURNER and LEWIS. Suppuration in the accessory sinuses of the nose; a bacteriological and clinical research. *The Edinburgh Medical Journal*, November, 1905.

354. GERBER. On the diagnosis of maxillary cysts. Remarks on Professor Chiari's article on the diagnosis of tumors of the maxillary antrum. *Deutsche med. Wochenschr.*, No. 19, 1905; and Prof. Chiari, Wien: "Entgegnung zu vorstehenden Bemerkungen." *Ibid.*, No. 50.

355. NEUFELD. Tuberculosis, syphilis, and suppuration of the maxillary antrum. *Arch. f. Laryngol.*, vol. xvii., book 2.

356. MADER. Radiotherapy in chronic inflammation of the maxillary antrum. *Arch. f. Laryngol.*, vol. xvii., book 2.

357. DENKER. On the radical operation in chronic empyema of the maxillary antrum. *Arch. f. Laryngol.*, vol. xvii., book 1.

358. DELSAUX. The intracranial complications of the accessory sinuses. *La presse otolaryngologique Belge*, 1905, book 8.

359. LUC. A case of suppurative meningitis originating in the frontal sinus cured by the opening of the skull. *La presse otolaryngologique Belge*, 1905, book 9.

360. CHAUVEAU. Syphilitic diseases of the frontal sinus. *Arch. internat. d'otol.*, etc., p. 517, 1905.

361. ONODI. Disturbance of vision and blindness of nasal origin due to disease of the posterior accessory cavities. *Arch. f. Laryngol.*, vol. xvii., book 2.

353. TURNER and LEWIS. *Suppuration in the accessory sinuses of the nose; a bacteriological and clinical research.*

This is a long and interesting paper.

The conclusions arrived at are:

1. That the organisms found in the healthy nasal cavities belong to the same varieties as those occurring in abnormal conditions of the nose.
2. That the pus obtained from some cases of antral suppuration may combine organisms similar to those occurring in the buccal cavity.
3. That occasionally bacilli distinctive of dental caries may be isolated from the pus of an antral abscess.
4. That the healthy accessory sinuses are probably sterile.
5. That there are three main types of organisms commonly met with in suppuration of the accessory sinuses, namely, streptococci, pneumococci, and staphylococci.
6. That in the cases of chronic suppuration streptococci were found in 80 per cent. whilst in the more recent cases they occurred in 60 per cent.
7. That the swabs taken direct from the affected cavities provide from the bacteriological standpoint more trustworthy results than swabs taken in the same cases from the nasal cavities.
8. That in recent cases virulent organisms are met with twice as often as in cases of chronic suppuration.
9. That clinical evidence supports the view that the antrum is more frequently infected by way of the nasal cavity, and that this opinion is corroborated by bacteriological investigation.
10. That nasal polypi occur more frequently in cases of associated sinus suppuration, than in simple cases of antral abscess; their association with ethmoidal cell suppuration, whether occurring alone or as a complication of other sinus inflammation, is evident from the cases quoted.
11. That the recent cases of uncomplicated antral suppuration, as contrasted with those of a chronic type, respond more readily to treatment by lavage. ARTHUR CHEATLE.

354. GERBER. *On the diagnosis of maxillary cysts. Re-*

marks on Professor Chiari's article on the diagnosis of tumors of the maxillary antrum.

Gerber believes: 1. Hydrops of the antrum of Highmore is a disease which has not been demonstrated. The condition is usually a maxillary cyst. 2. Ectasia of the maxillary antrum is never caused by an acute or chronic inflammation but by a distended maxillary cyst. This is also objected to by Chiari, based on the observations of Hartmann, Zuckerkandl, Hajek, and Killian. 3. All maxillary cysts can be recognized by rhinoscopic examination because they cause the floor or the lateral wall of the nose to bulge in the region of the anterior insertion of the lower turbinal. Chiari does not deny this, though he objects to the general correctness of the above-mentioned observations. He found this distension in fourteen cases, among fifty persons who were not suspected of having maxillary cysts, which is not remarkable in view of the well-known asymmetry of the nasal cavities.

NOLTENIUS.

355. NEUFELD. *Tuberculosis, syphilis, and suppuration of the maxillary antrum.*

Two cases are described. In the first a tuberculous alveolus had led to a maxillary tuberculosis. In the other an empyema of the maxillary antrum with the formation of fistula in the mouth resulted from a gumma and sequestrum in the facial bony wall.

ZARNIKO.

356. MADER. *Radiotherapy in chronic inflammation of the maxillary antrum.*

A careful and interesting description of the attempts to influence the mucous membrane of the maxillary cavities by light therapy. Strebel's light proved to be unsuited. Better results were obtained by an induction-light apparatus invented by the author. The reader receives the impression that the results are not commensurate with the expense of time and trouble.

ZARNIKO.

357. DENKER. *On the radical operation in chronic empyema of the maxillary antrum.*

This is a combination of various methods and consists in a large incision through the mucous membrane extending

from the wisdom tooth to the middle line. The periosteum is retracted from the facial wall, and the mucous membrane is detached from the nasal wall in the region of the lower meatus and the floor of the nose. Broad opening of the maxillary antrum starting in the canine fossa. Removal of all diseased parts. The bony wall between the lower meatus and the antrum is removed. A right-angled flap of mucous membrane is reflected in the region of the lower meatus. The wound of the oral mucous membrane is sutured. The cavity is packed from the nose with vioform gauze for four days. Then subsequent treatment by irrigation and the insufflation of powder.

ZARNIKO.

358. DELSAUX. *The intracranial complications of the accessory sinuses.*

Delsaux gives in an interesting paper a short description of the literature. After referring to the statistics of Hajek, he found that the frontal sinus caused the greatest number of intracranial complications; then follow in order the sphenoidal cavities, the ethmoidal cells, and finally the antrum of Highmore. According to Hajek, purulent meningitis is the most frequent complication; then follow in frequency brain abscess, sinus thrombosis, extra- and intra-dural abscesses. Processes which run an extremely rapid course can be distinguished clinically. In these the infection extends along the lymphatics, while subacute processes extend along the venous channels. These two paths are carefully examined and elucidated by excellent drawings. It is further stated that an infection of the endocranium can take place from the accessory sinuses by a direct way through defects in the bone, which may be normal or pathologic. Pathological descriptions are added which are taken from Hajek's paper, and finally a chapter is devoted to the nature of the carriers of infection. After giving his conclusions, the author discusses the treatment, which depends, as Luc has stated, upon the localization and the nature of the complications present.

In the cases of meningitis an extensive trephining must be undertaken, which must include the posterior wall of the frontal sinus. The cerebral membranes are to be incised in order to give vent to the serous or purulent secretions.

Drainage. Operation should be preceded by lumbar puncture in order to avoid cerebral hernia. The extradural abscess is treated in a similar manner. In brain abscesses puncture should not be made through the membranes, but these should be incised and then puncture should be practised with the blade of a knife. Thrombophlebitis, according to Lermoyez, is a contra-indication for operative treatment.

This paper is one of the two principal papers read at the last meeting of the Belgian Society for Otology. BRANDT.

359. LUC. *A case of suppurative meningitis originating in the frontal sinus cured by opening of the skull.*

A very extensively reported case of purulent inflammation of the frontal sinus with intracranial complications and purulent meningitis was cured by three extensive operations. An acute frontal suppuration led to retention of pus and inflammation of the bone in the surrounding parts, necessitating an extensive exposure of the focus. The osteomyelitis continued. Cause, subperiosteal extradural abscess and a purulent infection of the arachnoid in the parietal region. A fistula in the dura led to the discovery of this last severe complication, which was cured by opening the dura and by disinfection of the affected region. BRANDT.

360. CHAUVÉAU. *Syphilitic diseases of the frontal sinus.*

A patient thirty-eight years of age suffered for five months from a right-sided suppuration of the frontal sinus which, in addition to a profuse discharge from the nose, caused occasional severe headache. Irrigation practised every two days and continued for months, as well as numerous small intranasal operations, were without result, and the radical operation was suggested. The patient was timid and consulted Chauveau, who elicited the history of syphilis affecting the mouth seventeen years before, and for which the patient had undergone treatment with mercury. Without treating the nose, mercury was again prescribed. After ten injections the headache had disappeared and the suppuration was less. Complete permanent recovery after twenty-five injections.

OPPIKOFER.

361. ONODI. *Disturbance of vision and blindness of nasal origin due to disease of the posterior accessory cavities.*

This is an exhaustive description of the relations between the posterior ethmoidal cells and the sphenoidal cavity and the optic canal, which the author has previously described a number of times. Enumeration of many actual observations in which affections of the accessory cavities of the nose have led to diseases of the optic nerve. Description of anatomic conditions of importance in the extension of the disease (semicanalis ethmoidalis Onodi; vascular furrows and emissaries in the anterior lateral wall of the sphenoidal cavity). Discussion of the crossed affections (left-sided nasal affection with a right-sided lesion of the optic nerve, and the opposite). A careful preparation and a general rearrangement of the material would, in the opinion of the reviewer, have been of advantage to this important and instructive paper.

ZARNIKO.

b.—OTHER AFFECTIONS OF THE NOSE.

362. SIEGEL. *Acute rhinitis. Terapija*, August, 1905.

363. KOENIG. The cure of a case of vasomotor rhinitis by the administration of weak doses of iodide of potash. *Arch. intern. d'otol.*, etc., vol. xx., p. 470, 1905.

364. E. VON TÖVÖLGYI. A new operative treatment for hypertrophy of the nasal turbinata. *Arch. f. Laryngol.*, vol. xvii., book 2.

365. MIODOWSKI. On involvement of the nasal mucous membrane in septic conditions, and report of a case of uncontrollable epistaxis. *Arch. f. Laryngol.*, vol. xvii., book 2.

366. SCHILLING. On the bacterial diagnosis of rhinoscleroma. *Arch. f. Laryngol.*, vol. xvii., book 2.

367. DOWNIE. A case of nasal obstruction from an unusual cause. *Lancet*, November 11, 1905.

362. SIEGEL. *Acute rhinitis.*

In addition to the rules of caution and the well-known applications of cocain and menthol, the author recommends tampons with a 1 : 5000 adrenalin solution, which arrests the discharge in from one to two hours. This same treatment is recommended for the coryza of the new-born. In hay fever Dunbar's serum is applied with benefit. SACHER.

363. KOENIG. *The cure of a case of vasomotor rhinitis by the administration of weak doses of iodide of potash.*

A young woman twenty-three years of age had suffered for two years from continuous discharging rhinitis (repeated

attacks of sneezing, excessive outflow of watery fluid, obstructed nasal respiration, headache, and lachrymation). Change of climate without benefit. Interior of the nose normal. Many forms of treatment, such as cauterization, hot air, adrenalin, orthoform, arsenic, etc., without avail. Immediate recovery after the use of iodide of potash (0.5 per day).
OPPIKOFER.

364. E. VON TÖVÖLGYI. *A new operative treatment for hypertrophy of the nasal turbinals.*

This operation consists in the use of simple straight surgical scissors instead of bent ones. The thumb is placed in the lower, the index finger in the upper opening, the other fingers on the branches. The operation is thus easily performed.
ZARNIKO.

365. MIODOWSKI. *On involvement of the nasal mucous membrane in septic conditions, and report of a case of uncontrollable epistaxis.*

In this patient, observed in Brieger's clinic, general sepsis developed from a severe ulcerating angina. Profuse epistaxis accelerated death. Examination showed that the blood-vessels and the nasal mucosa were filled with diplococci and staphylococci. The vessels were thrombosed and some ruptured, causing the unfortunate hemorrhage. Another case is reported of severe sepsis following ulcerating angina in which the nasal mucous membrane was affected secondarily to the tonsils.
ZARNIKO.

366. SCHILLING. *On the bacterial diagnosis of rhinoscleroma.*

In a patient with a clinical picture of rhinoscleroma many virulent diphtheria bacilli were found in smears taken from the diseased mucous membrane. The blood serum of the patient exhibited pronounced antitoxic properties. Microscopic examination of a small portion of the affected tissue confirmed the first diagnosis. This was a case of chronic diphtheria added to primary rhinoscleroma.
ZARNIKO.

367. DOWNIE. *A case of nasal obstruction from an unusual cause.*

A man suffering from cicatricial results of tertiary nasopharyngeal and nasal syphilis complained of nasal block. The free border of the soft palate and uvula were curved upwards and the enlarged uvula lay against the posterior walls with the tip directed upwards, producing the obstruction.

ARTHUR CHEATLE.

C.—NASOPHARYNX.

368. CHAUBEAU. Rapid retrogression of adenoid vegetations following measles. *Arch. internat. d'otol.*, etc., No. 6, p. 873, 1905.

369. SCHEIER. On the condition of the blood in children with adenoid vegetations. *Zeitschr. f. klin. Med.*, vol. lviii., books 3 and 4.

370. GAVELLO. An unusual affection of Rosenmüller's fossa as the cause of foetor ex ore. *Archivio italiano di otologia*, etc., vol. xvii., book 2.

371. BOBONE. Healing of a case of tuberculosis of the tonsils, uvula, pharynx, and nasopharynx with methylene blue. *Archivio ital. di otologia*, etc., vol. xvii., book 2.

372. MANGERI. A leech in the nasopharynx. *Arch. internat. d'otol.*, etc., 1905, No. 5.

373. COMPAIRE. On the clinical study of malignant tumors of the nasopharynx. *Arch. internat. d'otol.*, etc., vol. xx., p. 368.

368. CHAUBEAU. *Rapid retrogression of adenoid vegetations following measles.*

A child ten years of age suffered from adenoids of a moderate degree and their removal was recommended. The operation was postponed because the child suffered from measles and severe pneumonia. A few months later the patient returned and the adenoids had disappeared. A similar spontaneous retrogression of adenoid vegetations had been observed by the author in three other patients who had been taken ill with the grip. The reviewer observed recently a case of moderate adenoids, causing nasal obstruction and catarrh in the nose and ear for one year, disappear completely after a general illness—scarlet fever and nephritis—which lasted two months.

OPPIKOFER.

369. SCHEIER. *On the condition of the blood in children with adenoid vegetations.*

An examination of the blood of twenty-one children was made. After extirpation of the hypertrophied pharyngeal tonsil the large lymphocytes increase just as the small

lymphocytes decrease in number. An unusually favorable influence is exerted upon the blood by this operation if the children are subsequently sent to the country for four or five weeks.

BRUEHL.

370. GAVELLO. *An unusual affection of Rosenmüller's fossa as the cause of fætor ex ore.*

In a patient fifty-eight years of age suffering from fætor a cheesy mass was found in one of Rosenmüller's fossæ. The condition was removed. Directly after its removal microscopic examination showed the presence of the bacillus fluorescens putridus.

RIMINI.

371. BOBONE. *Healing of a case of tuberculosis of the tonsils, uvula, pharynx, and nasopharynx with methylene blue.*

A patient fifty-four years of age was suffering from pulmonary tuberculosis. A tuberculous ulcer occupying the entire posterior wall of the pharynx, the palatal tonsils, and the nasopharynx was curetted with a sharp spoon and treated with a 50 per cent. solution of lactic acid and a 2 per cent. watery solution of methylene blue. These applications were frequently repeated. Recovery after two months.

The author is inclined to believe that the rapid success of the treatment was due to the action of the methylene blue, because the treatment with lactic acid usually is a very much slower one.

RIMINI.

372. MANGERI. *A leech in the nasopharynx.*

An Italian farmer thirty-four years of age had been suffering for eight days from epistaxis and difficulty in swallowing. A posterior rhinoscopy showed the presence of a leech on the posterior surface of the vomer.

Leeches not infrequently get into the upper respiratory passages in Sicily, as the peasants do not use glass drinking-vessels and usually drink directly from the spring.

OPPIKOFER.

373. COMPAIRE. *On the clinical study of malignant tumors of the nasopharynx.*

The author has observed an unusual number of malignant diseases of the nasopharynx (since 1897, twenty cases).

Sarcoma is more frequent than carcinoma, and they have occurred in eleven women to nine men. The sarcomata develop generally from the posterior pharyngeal wall, while the carcinomata arise from the region of the Eustachian tube or the choanæ. In the beginning stages of the carcinomata the neighboring glands are involved; this occurs at a much later period in the sarcomata, at the time of ulceration. The author has observed recovery in no case whether by operation or any other treatment.

OPPIKOFER.

PALATE, PHARYNX, AND BUCCAL CAVITY.

374. COLLET and TROULLIEUR. Congenital perforation of the posterior pillars of the fold of the palate. *Arch. internat. d'otol., etc.*, 1905, p. 516.

375. KOTSCHANOW. On the treatment of acute retropharyngeal abscesses. *Russki Wratsch*, 1905, No. 23.

376. REUTER. Hairy pharyngeal polypi. *Arch. f. Laryngol.*, vol. xvii., book 2.

377. HALKIN. On the ossification in the tonsils. *La Presse otolaryngologique Belge*, 1905, book 10.

378. HOPE. Tonsillectomy. *Arch. internat. d'otol., etc.*, vol. xx., p. 466.

374. COLLET and TROULLIEUR. *Congenital perforation of the posterior pillars of the fold of the palate.*

The author has observed accidentally in a man eighty-two years of age two congenital defects in the left posterior palatal arch and one large defect in the right. OPPIKOFER.

375. KOTSCHANOW. *On the treatment of acute retropharyngeal abscesses.*

Acute retropharyngeal abscesses occur most frequently in children between six months and a year and a half old. Catarrhs of the upper air passages and aural suppurations are the chief causes. The pus generally contained streptococci. With the retropharyngeal abscesses the anterior glands are enlarged and break down. Treatment can only be surgical. The opening of the abscess from the pharynx can only be performed in a small number of cases where the abscess is small and the situation is high up. The majority should be opened from the neck, and the cervical lymphatics should be removed at the same time.

SACHER.

376. REUTER. *Hairy pharyngeal polypi.*

Nineteen cases are collected from literature, with the addition of one personally observed case. The anatomy, origin, and clinical symptoms are described. ZARNIKO.

377. HALKIN. *On the ossification in the tonsils.*

The author believes that the ossification of the cartilaginous rudiments in the palatal tonsils occurs as in the case of the bones of the skeleton, by means of periostitic ossification which is preceded by indirect ossification. This development does not agree with the view of the metaplastic origin. The presence of a small cyst originating from the second branchial cleft shows that there must be a disturbance in development of the branchial apparatus. These features observed in the tonsil do not confirm Cohnheim's theory on the origin of tumors. BRANDT.

378. HOPE. *Tonsillectomy.*

Hope believes that in disease of the tonsils tonsillectomy should be more frequently practised. After-hemorrhages are rare. In two thousand tonsillectomies hemorrhage severe enough to be noted was observed in only two.

In the opinion of the reviewer, after-bleeding depends upon whether the patient is a child or an adult. In the latter hemorrhage occurs very much more frequently than in 1:1000 cases, and too great operative fervor is to be deprecated. The reviewer is also of the opinion that in general practice the palatal tonsils are too frequently removed and the adenoids allowed to remain. OPPIKOFER.

REPORT ON THE PROGRESS IN OTOLOGY DURING THE FIRST QUARTER OF THE YEAR 1906.

BY PROF. ARTHUR HARTMANN, BERLIN.

Translated by Dr. ARNOLD KNAPP.

GENERAL.

A.—REPORTS.

1. MAGNUS. Report on the otological division of Professor Gerber's clinic in the year 1904. *A. f. O.*, vol. lxvii.

2. FALLAS. The statistics of the otolaryngological service in the St. John's Hospital in Brussels. *La Presse otolaryngologique Belge*, books 1 and 2, 1906.

1. MAGNUS. Report on the otological division of Professor Gerber's clinic in the year 1904.

4530 patients were treated, presenting 6867 affections, of which 2027 belonged to the ear and 2515 to the nose and pharynx. Of interest is a myxofibroma which completely occluded the antrum and aditus. A report follows of two cases of labyrinth caries and three cases of severe pyemia which recovered, four cases of sinus thrombosis without characteristic temperature curves and four deaths.

ZARNIKO.

2. FALLAS. The statistics of the otolaryngological service in the St. John's Hospital in Brussels.

In 1905, 14,186 patients were treated. Of these 2422 were new patients and 1471 were referred from other departments.

Of interest were: 1. A case of mastoiditis, operation, immediate suture, recovery in eight days. 2. Subacute mastoiditis, extradural abscess, recovery. 3. Mastoiditis, cholesteatoma, extradural abscess, meningitis, secondary suture, recovery. 4. A carcinoma of the ear simulating

Bezold's mastoiditis. 5. A woman who was operated on for chronic mastoiditis returned six months later complaining of vertigo and vomiting. An operation was not necessary as the symptoms were referable to chronic gastritis. 6. A case of tuberculosis of the nose with multiple surgical operations. In six cases of disease of the accessory cavities of the nose external operations were performed in five, one was treated intranasally. The result in four cases was favorable. Finally a case of syphilitic tumor at the inner angle of the eye is reported.

BRANDT.

b.—GENERAL PATHOLOGY AND SYMPTOMATOLOGY.

3. HOŘČLČKA and POLEDUE. Two cases of cerebro-spinal meningitis with report of the nasal examination of a number of healthy persons regarding the presence of a micrococcus of the type of the meningococcus. *Wiener klin. Wochenschrift*, No. 40, 1905.

4. CORNET. Epiphora of labyrinthine origin. *Arch. internat. d'otol.*, etc., vol. xxi., p. 120.

5. EINIS. Reflex disturbances originating in the nose, ear, and throat. *Wratschebnaja Gaseta*, No. 7, 1906.

6. BAUMANN. On the pharyngeal reflex. *Münch. m. Wochenschr.*, No. 13, 1906.

7. VALI. On objective noises of the ear. *A. f. O.*, vol. lxvi., p. 104.

8. LESZYNSKY. Epidemic cerebrospinal meningitis. *Medical Record*, March, 3, 1906.

9. AMBERG. Congenital malformation of the left auricle and of the external cutaneous canal. *Journ. American Medical Association*, December 9, 1905.

10. SHAMBAUGH. A case of vicarious bleeding from the external auditory canal. *Laryngoscope*, January, 1906.

3. HOŘČLČKA and POLEDUE. Two cases of cerebro-spinal meningitis with report of the nasal examination of a number of healthy persons regarding the presence of a micrococcus of the type of the meningococcus.

The nasal secretion in 207 healthy persons was examined who had not come in contact with cases of meningitis. Positive results were found in twenty-five (12 per cent.), while in twenty-nine persons who had come in contact with meningitis patients positive results were found in eleven (37 per cent.). The authors, therefore, are not certain whether in these cases the meningococcus was really present. It might have

been the micrococcus catarrhalis Pfeiffer, because in only a few cases cultures were made, and the diagnosis rested upon tinctorial and morphological data.

In general micro-organisms like the meningococcus do not remain for a long time in the nose of a healthy individual. After meningitis they rapidly disappear in the nasal discharge.

The authors, moreover, found in the nasal secretion of 119 children in the florid stage of measles a positive result in thirty-four.

WANNER.

4. CORNET. *Epiphora of labyrinthine origin.*

This unusual case concerned a soldier twenty-one years of age who suffered from bilateral catarrh of the tubes. If the right handle of the malleus was moved in any way the conjunctiva of the eye on the same side became congested and there was a pronounced flow of tears.

OPPIKOFER.

5. EINIS. *Reflex disturbances originating in the nose, ear, and throat.*

First Case: Repeated epileptic attacks in a man fifty years of age caused by cerumen and cured after its removal.

Second Case: Attacks of asthma cured on removal of a large mucous polyp from the nose.

Third Case: Neuralgia of the fifth nerve healed after removal of moderate nasal polypi and amputation of hypertrophied lower turbinal.

Fourth Case: Chorea in a girl of eleven cured after removal of adenoids.

Fifth Case: Reflex cough caused by adenoids. SACHER.

6. BAUMANN. *On the pharyngeal reflex.*

The author distinguishes between the pharyngeal and the palatal reflex. The former was tested on 430 soldiers and 155 students. The relation of the normal reflex to the diminished and to the increased one was, in the case of the soldiers, 6.5 : 3 : 1, in the students 2.5 : 1 : 1.5. The reflex was absent in only one case.

In chronic pharyngeal catarrh no increase was observed. In hypertrophy of the tonsils a diminution was very seldom seen. These results do not agree with the observations of

the reviewer. In hysteria the reflex was frequently decreased and sometimes absent. SCHEIBE.

7. VALI. *On objective noises of the ear.*

Objectively perceived entotic noises and sounds develop most frequently from an abnormality of the circulation or by tonic and clonic contractions of the muscles in the tympanum and in the pharynx. In the case reported the tone was a c^5 synchronous with the pulse arrested by depression of the tongue, by elevation of the soft palate, by catheterizing the tube but not influenced by pressure on the carotid. At the same time there was no movement of the drum membrane or variation in pressure in the external canal to be observed. This leads the author to regard chronic contraction of the tensor veli and palati muscle as responsible, and the sound as not produced directly by the muscle but owing to the contractions of the muscles there are changes in position, friction and various alterations in the condition of the air column which produce the tone. HAENEL.

8. LESZYNSKY. *Epidemic cerebro-spinal meningitis.*

Out of fifty cases seen by the writer, five thereof had involvement of the auditory nerve. In the first case observed, deafness occurred in the left ear on the fifteenth day and was permanent; in the second case bilateral deafness took place on the first day, complete and remained permanent; in the third case, bilateral deafness was noticed on the tenth day which remained complete and permanent in the right, the left recovered; in the fourth case bilateral deafness was noticed on the seventh day which remained permanent in the right, the left recovered; in the fifth case, deafness was noticed on the seventh day in the right ear. It is considered that the permanent deafness in these cases was due to infiltration and destruction of the auditory nerve. CLEMENS.

9. AMBERG. *Congenital malformation of the left auricle and of the external cutaneous canal.*

The left auricle shows arrested development. The ridge measures 4.6cm long, the width varies from 11 to 7mm, and the height from 7 to about 5mm. There are four distinct blind canals, two being found in the anterior fold between the

cartilage and the skin; the first of which measures 11mm, from the top and about 5mm deep, the second 28mm from the top and about 7mm deep. The third canal is in the middle of the ridge about 13 mm from the top, and the fourth one is in the posterior fold 22.5mm from the top neither of which shows any depth. In addition there are slight intimations of two shallow canals in the posterior fold, one 29 and the other 34mm from the top. The osseous canal seems filled with fibrous and cartilaginous tissue. The mastoid is well developed. The acoumeter is heard about one inch and by bone conduction. Middle tones not heard by air conduction but by bone conduction; high tones not heard by air or bone conduction. No hereditary history.

CLEMENS.

10. SHAMBAUGH. *A case of vicarious bleeding from the external auditory canal.*

Case, female, married, aged twenty-five, had had the initial hemorrhage from the right ear five years prior to consultation. Similar attacks have occurred at irregular intervals since, usually preceding the menstrual flow by one or two days, which was correspondingly diminished and not infrequently absent. During these five years attacks of furuncle were noted several times. Examination showed the canal to be partially obstructed by a swelling of the upper wall just inside the meatus which is smooth and covered with normal skin. The hemorrhage is from a point at the lower tip of the swelling. Treatment with chromic acid eventually brought much relief. There is also a history of superficial ulceration of the canal external to the swelling which rapidly involved the concha and the lobe. The ulcer was pronounced specific and rapidly healed under the influence of potassium iodide.

CLEMENS.

C.—METHODS OF EXAMINATION AND TREATMENT.

11. OSTMANN. Clinical studies on analysis of disturbances of hearing. Part IV.: The curve of sensitiveness of the ear made deaf by nervous disturbances, and its relation to the determination of the acuity of hearing according to the principle of Conta-Hartmann. *A.F.O.*, vol. lxi.

12. LUCAS. Errors in the examination of the deaf with tones and

- several physiological remarks on acoustics. *Deutsche med. Wochenschr.*, No. 9, 1906.
13. UFFENORDE. On the auscultation of the middle-ear cavities. *A. f. O.*, vol. lxvi., p. 1.
 14. LAVAL. Nasal auscultation of the ear during catheterization. *A. f. O.*, vol. lxvi., p. 120.
 15. GERSUNY. Excitement during narcosis. *Wiener klin. Wochenschr.*, No. 3, 1906.
 16. BLEGVAD. On Rinne's test and the determination of the hearing by the perception of tuning forks. *Nord. med. Arkiv.*, 1905, vol. i., book 2.
 17. KUTVIRT. On airoi as a diagnostic help in carious disease of the ear. *Wiener klin. therapeutische Wochenschrift*, Nos. 5 and 6, 1906.
 18. HAMM. Artificial drums of paraffin. *Deutsche med. Wochenschr.*, No. 8, 1906.
 19. HALBHUBER. Therapeutic notes. *Wiener med. Presse*, No. 48, 1904.
 20. MÜLLER. On the hemostatic action of paranephren. *Wiener klin. therapeutische Wochenschrift*, No. 2, 1906.
 21. RETHI. Remarks on Sondermann's paper: a new method for the diagnosis and treatment of diseases of the nose. *München. med. Wochenschr.*, 1906, No. 4.
 22. LEUWER. A new nasal aspirator. *Deutsche med. Wochenschr.*, No. 10, 1906.
 23. LAURENS. The aspiration of blood in surgery of the ear, nose, and throat. *Arch. internat. d'otol.*, etc., vol. xxi., p. 174.
 24. BARDES. Earache. *Medical Record*, January 20, 1906.
 25. MCSHANE. New and rational operation for the correction of prominent ear. *Indiana Medical Journal*, February, 1906.
 26. GOLDSTEIN. The oto-projectoscope. *Laryngoscope*, February, 1906.
 27. FRIDENBERG. Aspiration of the tympanic cavity after paracentesis; a valuable aid in the treatment of acute otitis media. *Medical Record*, March 3, 1906.
11. OSTMANN. *Clinical studies on analysis of disturbances of hearing. Part IV.: The curve of sensitiveness of the ear made deaf by nervous disturbances, and its relation to the determination of the acuity of hearing according to the principle of Conta-Hartmann.*
- This paper is hardly suited to a short review, especially as Ostmann gives his results in the last number of this publication under the title, *From Objective to Uniform Measure of Hearing*, vol. li., No. 3.
- ZARNIKO.
12. LUCAS. *Errors in the examination of the deaf with tones and several physiological remarks on acoustics.*

Lucae believes that Bezold is incorrect in assuming that the weighted tuning fork and covered organ pipes furnish the purest tones because they possess the fundamental tone without any overtones. By the aid of Quincke's interference apparatus, which instrument is described in the text, the proof is easily furnished that in every fork the high octave is distinctly heard. This can be even better demonstrated by means of a suitable resounder. The overtones, in the case of unweighted forks, will become distinct to an entire auditorium. Lucae has recently succeeded in making the higher octaves very distinct by the use of paper and resonators in the case of Edelmann's forks. The author believes that he has thereby discovered a source of error, because a deaf person may perceive the higher octave instead of the fundamental tone and thereby mislead the examiner. The presence of islets and gaps in the tone scale can only be referred to disease of the labyrinth, when the diseased ear, even if a suitable resounder is used and by the loudest blow of a large fork, would no longer perceive the given tone. According to Lucae this also has some prognostic importance. According to his experience treatment is absolutely valueless when the resonator tone is absent, while in other cases, as for instance in the after-treatment of those radically operated upon and in many cases of so-called sclerosis, an improvement in the hearing is possible. Consequently an examination with tuning forks should be practised if the examiner has determined with the aid of resonators the duration of the overtones and makes the examination with the fundamental tone after these overtones have died out. It must be taken for granted that the tuning-forks are all struck with equal intensity. This Lucae obtains by an attached mechanism for his weighted c-fork. Finally he draws attention to the air noise produced by blowing into a Galton's whistle which may lead to a confounding with the original tone, and recommends Koenig's rods.

NOLTENIUS.

13. UFFENORDE. *On the auscultation of the middle ear.*

This paper resulted from the contradictory condition found in two cases between the result on auscultation during catheterization (crepitant râles suggestive of an exudate-

in the tympanum) and the actual condition in the middle ear as shown on paracentesis (no fluid whatever). After quoting the generally accepted views on auscultation of the middle-ear cavities, the author describes his own investigations which were made partly on cadavers shortly after death and partly on disarticulated temporal bones. He comes to the following conclusions:

1. During auscultation of the middle ear with the otoscope it is impossible to determine the localization, whether the noise is far from or near the ear of the observer. Audible noises heard at a distance are produced in front of the tube. They may be present in the tube or in the tympanum and nevertheless sound distant.

If a marked obstruction for sound waves is situated in their path, an auscultation murmur is only perceptible if between the end of the catheter and the drum of the observer there is no plastic obstruction which causes the sound waves to be absorbed or reflected.

2. The vesicular murmur is produced principally at the end of the catheter and at the walls of the tube. The tympanum serves as a resounder.

3. The musical character of the crepitant râles does not tell us about the consistency of the secretion.

4. Crepitant râles produced in the tympanum must be explained by simple change in position of the secretion. They will be characterized by unusual intensity of sound and by a musically lower character, especially the after murmur, which means that the secretion has fallen back into its original position. The tubal noises are musically higher and less loud, corresponding to the smaller amount. The bursting of air bubbles can only explain a part of the secondary noises.

5. If on catheterization in a moist catarrh there is an auscultation murmur, the obstruction is probably to be found in the tube.

6. Removal of the discharge from the tympanum in other favorable conditions and when the drum is intact takes place to a certain degree through the tube into the epipharynx. If the collection of discharge is very slight then its distribution comes into importance.

7. As regards the perforation murmur, the presence of whistling denotes secretion but not necessarily the size of the perforation. A drum is not absolutely necessary to produce a perforation murmur.

HAENEL.

14. LAVAL. *Nasal auscultation of the ear during catheterization.*

Laval employs nasal auscultation for the more exact localization of the origin of murmurs heard during the catheterization of the tube in addition to the auscultation of the ear. This consists in the introduction of a hearing tube 2-3cm obliquely and upwards into the opposite nose.

His conclusions are as follows:

Noises produced at the tubal ostium are heard very loud through the nose, while with the ear they are perceived as indistinct, distantly situated, and hollow.

Murmurs produced in the tube can be perceived by both ear and nose and in about the same intensity.

Noises which take their origin in the tympanum can only be perceived by the ear.

If there is a slight amount of exudate in the tympanum, crepitant râles occasionally occur on bending the head of the patient during catheterization (removal of exudate through the tube). The contact murmur is produced in the tympanum at the moment of the greatest tension of the drum membrane. Nasal auscultation tells us of the removal of secretion from the tympanum through the tube. The greatest part of the crepitant râles is not produced in the tympanum but by the escape of exudate along the tube. The blowing noise is produced in the cartilaginous part of the tube. Its character depends upon the form of the tubal secretion. Rough blowing murmurs are produced by swelling and moisture in the tubal mucous membrane.

HAENEL.

15. GERSUNY. *Excitement during narcosis.*

The struggling and the sense of resistance make the patient restless during narcosis. It seems, therefore, well to not prevent his movement with force. After the first inhalations sleeves of celluloid are put on the arms of the patient, so that the arms may be moved but may not reach the mask.

The nurse prevents a patient from raising himself up by simply putting the flat hand under the heels and lifting the feet up from the table.

WANNER.

16. BLEGVAD. *On Rinne's test and the determination of the hearing by the perception of tuning-forks.*

The author states that if Rinne's experiment is made according to Bezold's description its value is reduced compared with the difference between air conduction and bone conduction. Moreover, as Moeller has shown, the same ear may present a positive and negative Rinne. He believes that Rinne's experiment, therefore, in its old form is useless, and is in favor of Ostmann's suggestion to determine air conduction and bone conduction separately. He always uses two forks, a simple a-fork and a Koenig's A-fork, which are struck by means of a pendulum apparatus. Towards the end of the period of vibration the fork is placed in front of the ear, so that the ear does not become over-fatigued. The best site for bone conduction is the mastoid fossa. It is impossible to isolate the two ears for bone conduction, because in the case of prolonged hearing of one ear the examination of the other ear is unreliable, as in the cases of cerumen when the bone conduction was found prolonged on both sides. The bone conduction can be just as well determined from the vertex after Schwabach's method.

JOERGEN MOELLER.

17. KUTVIRT. *On airol as a diagnostic help in carious diseases of the ear.*

Kutvirt recommends airol as an aid in diagnosis in ear diseases because when this remedy turns brown or black a carious process is to be suspected.

WANNER.

18. HAMM. *Artificial drums of paraffin.*

In order to protect large dry perforations of the drum membrane and tympanum from water and injury, Hamm recommends the use of a large sterilized piece of gauze soaked in hard paraffin, which is quickly put in place and allowed to harden. These artificial drums have the advantage of absolute freedom from irritability, and they not infrequently produce a marked improvement in hearing. The danger of retention of pus is excluded in possible relapses of the otitis.

because the pus would displace the paraffin and force it into the auditory canal.

NOLTENIUS.

19. HALBHUBER. *Therapeutic notes.*

Halbhuber paints the tubal ostium with Manoll's solution when catarrhal affections in the pharynx produce subjective tinnitus.

WANNER.

20. MÜLLER. *On the hemostatic action of paranephrin.*

As a hemostatic Müller has employed the impregnated suprarenin and adrenalin gauze. By this means these preparations are brought in definite amounts near the wound and the action is kept up for a longer time.

WANNER.

21. RETHI. *Remarks on Sondermann's paper: A new method for the diagnosis and treatment of diseases of the nose.*

Rethi mentions that Seifert and he have drawn attention to the diagnostic and therapeutic value of this method years ago.

SCHEIBE.

22. LEUWER. *A new nasal aspirator.*

In order to remove discharge from the nose and from the accessory cavities, two glass olives are introduced into the nasal openings, which are connected by rubber tubes with a double metallic tube. The suction is produced by a pump, while the patient at the same time closes his soft palate in taking a deep inspiration after pronouncing the consonant "K." This apparatus is better than Sondermann's because it can be disinfected, and it is applicable to persons of all ages.

NOLTENIUS.

23. LAURENS. *The aspiration of blood in surgery of the ear.*

To facilitate the arrest of discharge and to prevent in certain cases aspiration of blood into the upper air passages, Laurens has suggested the following apparatus. This consists of a large receiver which was made air-tight. A large cannula connected by means of a tube with the receiving vessel aspirates the blood from the field of operation.

OPPIKOFER.

24. BARDES. *Earache.*

It is recommended that as soon as earache begins the

patient should be kept quiet, put to bed, and placed upon fluid diet, and in other ways treated like a patient with high fever. The bowels should be kept open, and he suggests that a single dose of morphia may be given to ensure rest and comfort. Dry heat or else an ice-bag may be applied, although the former is more acceptable to most patients. Irrigation with hot bi-chloride solution, 1. to 5000, should be given every three hours, after which a few drops of a 12 per cent. carbol-glycerine solution may be instilled. No case should be allowed to suffer longer than twenty-four hours. If the pain continues and the drum-head is inflamed and bulging, it should be freely incised rather than simply punctured or allowed to break. The utmost care and cleanliness should be exercised in making the incision, lest a mild infection be converted into a more serious one from without.

CLEMENS.

25. MCSHANE. *New and rational operation for the correction of prominent ear.*

The auricles of this case extended at right angles from the head and measured at the distal margin one inch and three-quarters. An elliptical section of integument two inches in length and something more than half an inch in width was removed from the posterior surface of the auricle. The connective tissue was then carefully dissected away and the perichondrium roughened by the use of a curette. Strong catgut sutures were used in the cartilage in such a manner as to fold it on itself. The needle was introduced into the cartilage near the margin of the denuded area and thrust in as deeply as possible, care being taken not to pierce the skin on the anterior surface of the auricle. The needle was returned and brought out an inch and a half from the point of insertion. The needle was then carried across the denuded surface and similar hold was taken near the margin of the skin on the opposite side. Four or five of these sutures were introduced, and when they were tied the ear presented the normal anterior ridge in its proper position, the ear was contracted to its proper size and brought back to the proper distance from the head. Silk sutures were used to bring the margins of the skin together, and the catgut sutures were buried. The ears were dressed with cotton compresses and bandaged

as close to the head as possible to relieve the sutures of any undue tension. After two weeks the ears are normal in appearance and size. CLEMENS.

26. GOLDSTEIN. *The oto-projectoscope.*

This apparatus is designed to demonstrate the various pathological conditions seen on the membrana tympani and at the fundus of the auditory canal by projecting the exact image thereof on a small screen. The size of the image is about four (4) cm in diameter at the most brilliant focal point. The instrument is also available for demonstrations in nasal and pharyngeal diseases. CLEMENS.

27. FRIDENBERG. *Aspiration of the tympanic cavity after paracentesis; a valuable aid in the treatment of acute otitis media.*

The procedure suggested by Fridenberg is the evacuation, by suction, of the tympanic cavity immediately after cutting the drum. He uses a small glass bulb about five-eighths of an inch wide, shaped like an olive with a very blunt tip. The neck of the glass bulb is stuffed with sterile cotton and attached to a short rubber tube after both bulb and tube have been boiled. Immediately after paracentesis the glass bulb is pressed against the external meatus, plugging the canal hermetically. Suction is then applied and gradually increased until there is a flow of fluid from the middle ear. The effects of this aspiration by energetic suction are strikingly gratifying. There seems not only to be less pain after the paracentesis than when an incision only is made, but the otitic pain is more promptly and lastingly relieved. A second incision of the drum is less often required, and the drainage is much more free. This method also has certain diagnostic features, particularly in very young children and infants, proving that the incision was thorough and free. CLEMENS.

d.—DEAFMUTISM.

28. HELLER. *Two cases of aphasia in childhood. Wiener klin. Rundschau, No. 42, 1905.*

28. HELLER. *Two cases of aphasia in childhood.*

1. Deafness. A girl six years of age who had suffered

from convulsions at the age of two weeks does not speak and does not repeat, though comprehension for speech has existed since the second year. After instruction over a short period of time, the child had advanced so that she could attend the public schools.

2. Sensory aphasia. A boy ten years of age, premature birth, repeated convulsions continuing during the first and second years; learned to walk late. After instruction of about two years' duration, principally in writing and reading the knowledge of speech is relatively good.

Heller warns physicians and teachers of making the diagnosis of idiocy prematurely in children with disturbances of speech.

A similar warning the reviewer would like to make in regard to the diagnosis of deafness and aphasia when, as in the above cases, an exact functional examination with the continuous tone series is absent.

WANNER.

EXTERNAL EAR.

29. FOLKEL. A hollow needle to perforate the lobule of the ear. *Wiener klin. Rundschau*, No. 7, 1906.

30. VOSS. On the etiology of othematoma. *A. f. O.*, vol. lxvii.

31. VOERNER. On lymphangiectomia of the auricle. *München. med. Wochenschr.*, 1906, No. 9.

32. DELSTANCHE. Mastoiditis and furunculosis. *La Presse otolaryngologique Belge*, 1906, book 3.

33. WILLAUME-JANTZEN. Communication from the aural clinic of the military hospital in Copenhagen. *Militärlägen*, 1905, p. 201.

29. FOLKEL. A hollow needle to perforate the lobule of the ear.

This needle consists of a metal cannula $2\frac{1}{4}$ cm long upon which is a short trocar. After perforating the ear the trocar is withdrawn and the earring introduced through the cannula. If there is any infection the cannula is replaced by a thread of 10 per cent. dermatol.

WANNER.

30. VOSS. On the etiology of othematoma.

The author believes that in othematoma we have the condition described by Morel-Lavallée as traumatic detachment of the skin and the underlying tissues. This affection was later examined by Gussenbauer and Köhler and found to

result by a traumatism of the skin and to be characterized by the formation of a pocket between the skin and the underlying fascia into which there is an escape of lymph with a certain amount of blood. The contents of this pocket are usually yellowish but may have a red tinge, and never coagulate after evacuation. Experiments have been made on a rabbit's ear when the othematoma was produced by rubbing the ear between the fingers which confirmed the author's views.

ZARNIKO.

31. VOERNER. *On lymphangiectomy of the auricle.*

The tumor contained fluid which resembled lymph. The walls were lined with endothelium. It was therefore regarded as a lymphangiectomy of the auricle.

SCHREIB.

32. DELSTANCHE. *Mastoiditis and furunculosis.*

Description of two cases in which the diagnosis wavered between mastoiditis and furunculosis. In these cases Wilde's incision was recommended.

BRANDT.

33. WILLAUME-JANTZEN. *Communication from the aural clinic of the military hospital in Copenhagen.*

A plasterer sought aid on account of deafness. A few days later he returned with a very much ruptured drum with the statement that he had introduced a match into his ear, as he believed that was the way they treated the ear in the clinic. He claims to have had no pain. Uninterrupted recovery.

JOERGEN MOELLER.

MIDDLE EAR.

a.—ACUTE OTITIS MEDIA.

34. BAAR. Contribution to the etiology of acute suppurative otitis media after measles. *Wiener med. Wochenschr.*, No. 6, 1906.

35. RIMINI. Paralysis of the abducent nerve of aural origin. *Arch. internat. d'otolog.*, etc., vol. xxi., p. 125.

36. WOLKOWITSCH. On the method of trephining the mastoid process. *A. f. O.*, vol. lxvi., p. 180.

37. STENGER. Bier's congestion method in acute suppurative otitis. A new method of operating in cases of acute mastoiditis. *Deutsche med. Wochenschr.*, No. 6, 1906.

38. HEYNINX. Suppression of intra-aural dressings after the radical operation. *Arch. internat. d'otol.*, etc., vol. xxi., p. 185.

39. OSTMANN. On the diagnosis and prophylaxis of inflammation

of the labyrinth in acute otitis. *Münchener med. Wochenschr.*, 1906, No. 15.

40. DATES. The treatment of perforations of the tympanic membrane with especial reference to the use of gutta-percha tissue. *Medical Record*, November 11, 1905.

41. BALLIN. Ossiculectomy under local anesthesia in the treatment of chronic suppurative otitis media. *N. Y. Med. Journ.*, February 17, 1906.

42. BRAESLIN. Two cases of injury of the ear by lightning. *Brooklyn Med. Journ.*, April, 1906.

43. ROBINSON. Bacteriological findings in fifteen cases of epidemic cerebro-spinal meningitis, with special reference to the isolation of the meningococcus from the conjunctiva and from the circulating blood. *American Journ. Med. Sciences*, April, 1906.

44. REIK. The blood-clot dressing in mastoidectomy, considered physiologically. *Journ. American Med. Assoc'n*, March 31, 1906.

45. BRYANT. Technique of the radical tympano-mastoid operation when complicated by the forward position of the sigmoid sinus. *N. Y. Med. Journ.*, April 14, 1906.

46. SPRAGUE. Observations in two hundred cases of mastoid disease with operations. *Annals of Otol., Rhinol., and Laryngol.*, September, 1905.

34. BAAR. *Contribution to the etiology of acute suppurative otitis media after measles.*

In five children of one family after the disappearance of the eruption at the end of the second week suppuration started in one ear. In three of these five children the mastoid process had to be opened on account of threatening cerebral symptoms. In one case there was an extradural abscess. The bacteriological examination of Weichselbaum showed staphylococcus pyogenes in the pus from the ear and from the mastoid.

WANNER.

35. RIMINI. *Paralysis of the abducent nerve of aural origin.*

In reporting three cases of paralysis of the abducent nerve in purulent otitis media (in one of these bilateral paralysis) Rimini discusses the pathogenesis of this interesting complication of purulent ear disease. Of importance in etiology is a circumscribed meningitis, an epidural abscess, caries at the tip of the petrous pyramid or neuritis of the nerve.

OPPIKOFER.

36. WOLKOWITSCH. *On the method of trephining the mastoid process.*

The author attempts, like many others, to shorten the period of recovery after mastoid operations by removing, even in acute cases, the posterior bony canal wall. In addition to this the membranous canal is split in the posterior wall and by suitable gauze pads the edges of the flaps are forced into the mastoid. His results in acute cases are as follows: complete closure of the wound behind the ear in $4\frac{1}{2}$ weeks (average out of 31 cases); canal dry after $4\frac{1}{2}$ weeks (22 cases). His results in the chronic cases show an average recovery in between three and nine weeks.

HAENEL.

37. STENGER. *Bier's congestion method in acute suppurative otitis. A new method of operating in cases of acute mastoiditis.*

Contrary to the opinion of other authors, Stenger considers Bier's practice in acute aural suppurations to be a procedure of considerable importance. The presence of adenoid vegetations is considered a fair indication. If aural suppuration is complicated with mastoiditis a small incision is made through the soft parts, the periosteum is retracted, and a narrow canal is made into the mastoid antrum, or a fistulous tract is enlarged. A piece of gauze is introduced and a Bier's dry cup placed thereon, which remains in position for about three hours. This same procedure is repeated on the following days, the duration of the aspirating action is gradually diminished. This method has given the author rapid recoveries and he heartily recommends it. Moreover in two cases of mastoid operations which did not heal promptly the congestion method gave excellent results.

NOLTENIUS.

38. HEYNINX. *Suppression of intra-aural dressings after the radical operation.*

Based on a single case, the author recommends in operation for acute mastoiditis not to pack the wound with gauze but to immediately close the skin with Michel's hooks. Drainage takes place through the auditory canal, which contains a gauze tampon for four days.

OPPIKOFER.

39. OSTMANN. *On the diagnosis and prophylaxis of inflammation of the labyrinth in acute otitis.*

A timely diagnosis of threatening perforation into the labyrinth can only be made by the exact examination of the aural function from the beginning. If a rapid loss of perception for the highest tones down to the sixth octave occurs, the danger is threatening. The reviewer is inclined to regard this as of value only when hearing for speech is also poor. Moreover the reviewer observes that the hearing for speech has not been regarded, especially the test of Lucae and Dennert. Ostmann recommends the determination of the upper tone limit, Weber's test, and the examination of bone conduction. The very important lower tone limit is also forgotten.

SCHEIBE.

40. YATES. *The treatment of perforations of the tympanic membrane, with special reference to the use of gutta-percha tissue.*

Yates uses in fresh ruptures of the tympanic membrane in absence of suppuration a patch of gutta-percha tissue cut large enough to cover the perforation and afford firm attachment to the surrounding healthy membrane. When in subsiding acute otitis media the opening is slow in closing, Yates irritates the edges of the perforation with a solution of 8 to 12 per cent. of nitrate of silver and then attaches the rubber disk. In old perforations the edges are either pared off with a knife or cauterized to induce a new growth.

M. TORPLITZ.

41. BALLIN. *Ossiculectomy under local anæsthesia in the treatment of chronic suppurative otitis media.*

By using the injection method of Neumann producing local anæsthesia, the operation of ossiculectomy is considered sufficiently revolutionized to be recommended as a preliminary surgical procedure in all cases of chronic suppurative middle-ear disease in which local treatment of every kind has proved unavailing. The anæsthetic used is a 1 per cent. solution of cocaine to which is added an equal part of adrenalin solution 1:1000. Of this solution, 20-30 minims are injected into the superior wall of the external meatus at the place of union of the membranous and bony canal. The instruments used and the method of operating are described in detail.

CLEMENS.

42. BRAESLIN. *Two cases of injury of the ear by lightning.*

Case I., male aged twenty-seven, was struck while coming from the surf and was unconscious for three hours. The hair was burned from left side of occiput. Complained of fullness, roaring tinnitus, and impairment of hearing. Examination showed a perfectly round perforation in the left membrana tympani about one-eighth inch in diameter, slightly anterior to and below the centre, the remainder of the drum being pale.

Case II. showed a perforation in the left membrana tympani in the centre just behind the umbo, the subjective symptoms being similar to those in Case I. Both cases made a rapid and perfect recovery.

The author is of the opinion that a small charge of electricity doubtless followed the line of moisture through the external auditory canal and caused the perforations. The sound-perceiving apparatus was carefully examined and found to be uninjured.

CLEMENS.

43. ROBINSON. *Bacteriological findings in fifteen cases of epidemic cerebro-spinal meningitis, with special reference to the isolation of the meningococcus from the conjunctiva and from the circulating blood.*

In a study of fifteen cases the organism isolated from the spinal fluid, circulating blood, pus from the conjunctiva and from the central nervous system at autopsy, agrees in all respects with the diplococcus intracellularis meningitidis of Weichselbaum. It was isolated in pure culture from the spinal fluid of the fourteen cases in which lumbar puncture was performed and is to be considered the causal agent in all these cases. This organism was obtained from the circulating blood of two of the four investigated cases, but in one only did it grow on the various culture media. It is probably only an occasional invader of the circulating blood. It may be present in the blood for many days during the course of the disease and does not occur only shortly before death. Secondary lung infection with pyogenic organisms is frequent. Terminal broncho-pneumonia was found in five of the six cases that came to autopsy.

CLEMENS.

44. REIK. *The blood-clot dressing in mastoidectomy, considered physiologically.*

The primary object in the use of the blood-clot method is to obtain healing of the mastoid wound by first intention. Such a result will restore the normal contour of the part, reduce the period of healing to five or seven days, and render the prolonged and painful after-treatment of other methods unnecessary. The patient's blood flowing into the wound, when safeguarded from later infection, rapidly clots and forms a framework on which the new tissue is built. Even if the wound cavity is not surgically clean, it has been demonstrated that the blood possesses certain bactericidal power which is more active when drawn from the vessels than when still in the circulation. The difference is thought to be due to the leucocytes of the clot breaking down and discharging their entire complement of nuclein. The bactericidal action is transient and is only present when the blood is alkaline. The use of certain chemical antiseptics usually employed in cleansing the wound materially reduces this alkalinity, and some of the failures of this method, due to the disintegration of the blood-clot, are probably traceable to this cause. It is more rational to rely on dry cleaning of the wound, or to wash the cavity with sterile salt solution which, if it produces any effect on the coming clot, renders it more alkaline and thereby increases its power to control septic action. To avoid the formation of stitch abscesses, the subcutaneous silver-wire suture is advised. Care must be taken not to penetrate the skin at any point as the staphylococcus epidermidis albus is found in the deeper layers of the corium. Suggestions on the technique are added. Reik believes that this method will be accepted as the standard in mastoidectomy.

CLEMENS.

45. BRYANT. *Technique of the radical tympano-mastoid operation when complicated by the forward position of the sigmoid sinus.*

Several cases are here reported to demonstrate the author's method of avoiding injury to the sigmoid sinus when it approaches the external auditory canal. When the sinus has been uncovered in an extremely anterior position the posterior wall of the auditory meatus is removed, and the dura mater covering the front of the cerebellum is pressed back with a

flat retractor, to allow the operator to enter the antrum. The membranous meatus is slit posteriorly and longitudinally and is lightly packed with gauze to separate the edges. The postaural wound is allowed to close without sutures, and the remaining small cavity fills up with blood-clot. The middle-ear cavity is not packed, convalescence and epidermization being hastened thereby. The exposure of the dura mater does not contraindicate the use of the modified blood-clot.

CLEMENS.

46. SPRAGUE. *Observations in two hundred cases of mastoid disease with operations.*

One hundred and fifty-eight cases were acute and forty-two chronic. The causes of inflammation in the acute cases were: scarlet fever in six, measles in two, typhoid fever in one, and influenza in 149 cases. The principal subjective symptom was pain just after midnight; tenderness, profuse discharge, and the nipple-like protrusion of the upper posterior quadrant of the drum-head often indicate mastoid involvement, particularly sagging of the canal wall. The white count of the blood from 16,000 to 20,000 or above means pent-up pus somewhere; a polynuclear count of 80 per cent. or over gives evidence of septic infection. Lumbar puncture gave in two serous meningitis cases immediate relief to the brain-pressure symptoms. Thrombosis of the lateral sinus in eight cases, six recovered without ligation, one died of pyæmia with metastatic abscess, another of leptomeningitis. Sinus phlebitis in four cases due to streptococcus all recovered. Extradural abscess in four cases, one of which showed three independent abscesses, one over the root of the zygoma, one over the roof of the tympanum, and one over the roof of the mastoid; this case was also complicated by thrombosis of the sinus; all recovered. Serous meningitis complicated three cases; all of which died. Dementia, one with somnambulism, in two cases, sixty-five and seventy-nine years of age respectively. One case with dry necrosis had only slight deafness before, drum-head and canal normal, but the mastoid, up to the whole inner surface, was one mass of softened necrotic tissue intermingled with thick cheesy pus. One case of purulent meningitis was due

to trephine injury; in an attempt at opening the mastoid with trephine, a button of dura and brain tissue had been cut along with button of bone. One case had both mastoids involved; after operating on one mastoid, a large mass of adenoids and two enormous tonsils were removed, but in the other ear paracentesis of the drum-head resolved the unoperated mastoid without further trouble. Sprague uses the cigarette drainage after operation. Fifteen cases died, four of pyæmia, three of serous meningitis, three of brain abscess and meningitis, two of purulent meningitis, one of septicæmia, one of shock,—a child two months old,—and one of adenocarcinoma, eight months after operation,—all, except the baby, from complications well established before operation. One hundred and four out of one hundred and fifty-eight acute cases were healed in four weeks, twenty-five of these in two and seventy-six in three weeks; one was delayed by diabetes. Private cases heal much more quickly than the average hospital case. Of complications were: Septic arthritis in two cases (one streptococcus), streptococcus infection of the skin of the face and scalp resembling erysipelas in two cases; one died at the age of seventy-nine. The ages of the patients ranged from six weeks to seventy-nine years; every case, even the youngest showed mastoid cells external to the antrum.

M. TOEPLITZ.

b.—CHRONIC SUPPURATIVE OTITIS.

47. ISEMER. On primary tuberculous disease of the mastoid process in childhood. *A. f. O.*, vol. lxvii.

48. GERSUNY. An operation in motor paralysis. *Wiener klin. Wochenschrift*, No. 10, 1906.

49. RICHARDS. The non-operative treatment of chronic otitis media purulenta, with special reference to the use of pyoktanin. *The Laryngoscope*, Sept., 1905.

50. COTT. Peculiar symptoms following a radical operation. *Journ. Amer. Med. Assoc.*, Nov. 17, 1905.

47. ISEMER. On primary tuberculous disease of the mastoid process in childhood.

Of forty mastoid suppurations in children up to thirteen years, the author found tuberculosis present in four. The diagnosis was made from microscopic examination of sections and bacteriological examination of a smear and inoculations.

He comes to the following conclusions: 1. Mastoid tuberculosis occurs in early childhood more frequently than is generally assumed, and in fact 13 per cent. of all mastoid cases are tuberculous. 2. About half of these tuberculous mastoiditis are primary—in other words, originate by way of the blood current; the other half are secondary, usually an extension from a previously affected lymphatic tissue in the naso-pharynx. 3. The beginning of the disease is an insidious one, not painful. The findings in operations are not characteristic. 4. The most important proof for the tuberculous nature of the disease is furnished by the microscopic examination of diseased parts. Animal experimentation is also definite. 5. The chances of relief from operation are very favorable in the cases of primary tuberculous mastoiditis, different, however, in cases of an extension of the tuberculous disease, because the progression of the primary focus may threaten the life of the patient.

ZARNIKO.

48. GERSUNY. *An operation in motor paralysis.*

Gersuny reports a case of facial paralysis occurring after a mastoid operation. In order to relieve this condition the orbicular muscle of the mouth was dissected free both in the upper and the lower lip through the mucous membrane. After a division in the middle line the non-paralyzed half was united with the paralyzed half. The wound of the mucous membrane was united. After a comparatively brief interval the facial paralysis was completely cured.

WANNER.

49. RICHARDS. *The non-operative treatment of chronic otitis media purulenta, with special reference to the use of pyoktanin.*

In a large number of cases of chronic otitis purulenta, where operative interference is not imperatively demanded, milder measures lead to cures, particularly pyoktanin 4.0 with boric acid 36.0 used as powder or in watery solution of varied strength. Of the thirty-six tabulated cases thus treated six were not improved at all, fourteen were improved, sixteen were cured. Three of the cured cases had a temporary relapse, but with final cessation of the discharge.

M. TORPLITZ.

50. COTT. *Peculiar symptoms following a radical operation.*

A female physician who had been suffering from a fetid discharge and caries of the left middle ear and a myocarditis was radically operated upon; the mastoid cells and cavity were filled with granulations and débris, but without pus. The temperature rose up to the eighth day to 101.6°, fell again, but jumped on the twelfth day to 104.4°, reached on the seventeenth 105°, fell to 99°, rose to 104°, and reached on the twenty-sixth day with frequent rises and remissions the normal line. Opening of the sinus was contemplated, but not done. The pulse had varied from 56 to 110.

M. TOEPLITZ.

C.—CEREBRAL COMPLICATIONS.

51. NEUMANN. The differential diagnosis of cerebellar abscesses and labyrinthine suppuration. *A. f. O.*, vol. lxvii.

52. HEIMANN. A case of acute abscess of the temporal lobe. *A. f. O.*, vols. lxvi., lxvii.

53. UFFENORDE. A case of cerebellar abscess with almost complete amaurosis after acute purulent otitis, with recovery. *A. f. O.*, vol. lxvi.

54. PONTOPPIDAN. A case of one-sided sinus thrombosis with epidural and subdural abscesses. *Hospitaltidende*, 1906, p. 285.

55. STENGER. A report of cases of serous meningo-encephalitis of otitic origin. *A. f. O.*, vol. lxvii., p. 144.

56. GERBER. Encephalitis and acute otitis of influenzal origin. *A. f. O.*, vol. xli., p. 31.

57. ZERONI. Operative meningitis. *A. f. O.*, vol. lxvi., p. 199.

58. HANSBERG. Sinus thrombosis and articular rheumatism. A contribution to the connection between the ear and general diseases. *Zeitschrift für ärztliche Fortbildung*, No. 4, 1906.

59. GRADENIGO. A characteristic symptom of purulent thrombosis of the superior longitudinal sinus. *A. f. O.*, vol. lxvi., p. 243.

60. IWANOFF. The opening of the bulb of the jugular vein in otitic pyæmia. *Chirurgija*, July, 1905.

61. IWANOFF. The technique and report of cases of operation on the jugular bulb. *A. f. O.*, vol. lxvii.

62. IGLAUER. A case of mastoiditis complicated with extradural abscess, without history of a discharge from the auditory canal. *Annals Otol., Rhinolog., and Laryngolog.*, March, 1906.

63. BARSTOW. A case of tympanic and mastoid cholesteatoma; extradural abscess; sinus thrombosis; prolonged pyæmic temperature without metastases; recovery. *Medical Record*, February 10, 1906.

64. STARR. Intracranial lesions as sequelæ of chronic purulent otitis media. *Medical Record*, March 10, 1906.

65. OPPENHEIMER. Mastoiditis and sigmoid sinus thrombosis in an infant. *New York Medical Journal*, March 31, 1906.
66. BRYANT. Operative technique and after-treatment for mastoiditis with epidural complications. *Medical Record*, March 31, 1906.
67. HASTINGS. Sinus thrombosis. Two cases with masked symptoms. *Journ. Amer. Med. Assoc.*, Nov. 18, 1905.
68. BARNHILL. The diagnosis of intracranial complications of suppurative ear disease. *Journ. Amer. Med. Assoc.*, Nov. 11, 1905.
69. RICHARDS. A case of infective sigmoid sinus thrombosis and jugular vein infection of otitic origin without apparent mastoid involvement in an adult; operation; recovery. *N. Y. and Phil. Med. Journ.*, December 16, 1905.

51. NEUMANN. *The differential diagnosis of cerebellar abscesses and labyrinthine suppurations.*

Disturbances of equilibrium, vertigo, nausea, vomiting, headache, optic neuritis, variations in temperature, do not aid in the differential diagnosis between cerebellar abscesses and labyrinthine suppurations, because they occur in either disease. Nystagmus is, however, a symptom of more importance. Nystagmus caused by disease of the labyrinth is characterized by the following feature, namely, that the symptom becomes weaker and gradually disappears in progressive destruction of the labyrinth. The nystagmus originating in the cerebellum increases with the progress of the affection and finally attains such a degree as is never seen in diseases of the labyrinth. Moreover, if at the beginning nystagmus is present only when the eyes are turned to the healthy side and then suddenly changes to a nystagmus when the eyes are turned to the affected side, a cerebellar abscess may be diagnosed with certainty and a labyrinthine origin may be excluded.

If it is necessary at the operation to open the labyrinth, the labyrinthine nystagmus diminishes in intensity, while the cerebellar nystagmus is uninfluenced.

Certain points in the operation of cerebellar abscesses and the after-treatment are then given (the introduction of iodoform gauze strands which are soaked in hydrogen peroxide in order to destroy anaërobic bacteria). Five case histories are given.

ZARNIKO.

52. HEIMANN. *A case of acute abscess of the temporal lobe.*

Injuries of the ear have increased since the Russo-Japanese war among the patients of the author. A single case history (cauterization of the ear, destruction of the drum, consecutive mastoid otitis with necrosis, abscess of the temporal lobe; operation; recovery) leads the author to publish extensive statistics on otitic brain abscess.

These include 819 cases, of which 645 had been studied by the author in the original or in extensive reports and 174 were not accessible. Both categories are grouped in tables. The author endeavors to solve the following questions: 1. The proportion of the otitic cerebral abscess to the cerebellar abscess; the frequency of abscesses in the various situations in the cerebrum. Answer: Abscesses of the cerebrum are twice to three times as frequent as cerebellar abscesses. Frontal lobe abscesses are least frequent; those in the occipital lobe come next and those situated in the temporal lobe are the most frequent. 2. Relations of otitic cerebral and cerebellar abscesses to the various periods of life. Answer: Otitic brain abscess is least frequent after the sixtieth year, than in the first five years of life; it is most frequent in the second and third decades. 3. Relations of otitic cerebral and cerebellar abscesses to sex. Answer: They occur in men three times as frequently as in women. 4. Contrary to generally accepted opinion, the author finds the left side more frequently affected than the right. 5. As regards multiplicity of abscesses, 45 cases (that is seven per cent.) had two abscesses, one case had three, and two presented multiple abscesses. 6. The most frequently fatal complication of brain abscess is meningitis, in the second line sinus thrombosis. 7. The results of recovery are better in abscesses produced by an acute suppuration than in those following chronic suppurations. They are more favorable, moreover, in abscesses of the cerebrum than in cerebellar abscesses.

ZARNIKO.

53. UFFENORDE. *A case of cerebellar abscess with almost complete amaurosis after acute purulent otitis, with recovery.*

The patient came for treatment on account of hypertrophic rhinitis and consecutive tubal catarrh. Turbinotomy was performed on the right side. Fourteen days later acute

otitis set in on the left side, requiring the mastoid operation. A few days later a radical operation was performed. Shortly after that an infected thrombus was evacuated from the sigmoid sinus after ligating the jugular vein. No fever for fourteen days. Suddenly decided diminution of vision. Choked disk. Hemorrhage in the macula, star-shaped figure as in albuminuric retinitis. Two days later the surface of the cerebrum adjoining the sigmoid and transverse sinuses was exposed. Puncture. A purulent infected area of softening was exposed and drained. Gradual recovery, though motor disturbances were present for a time (convulsions of an apoplectic character). Vision, left, $\frac{1}{16}$; right, $\frac{1}{16}$.

ZARNIKO.

54. PONTOPPIDAN. *A case of one-sided sinus thrombosis with epidural and subdural abscesses.*

A woman forty-two years of age suffered from headache and vertigo after acute purulent otitis. There was tenderness to pressure along the anterior margin of the mastoid process and beginning choked disk. The mastoid was opened and as the symptoms continued an epidural abscess was evacuated and a thrombosed sinus resected after ligation of the jugular vein. The temperature continued high. In the sigmoid fossa another epidural abscess was discovered. Then rigidity of neck, stupor, and diplopia set in. A discolored area in the internal-sinus wall led to a subdural collection of pus. Convalescence was clouded by a slight psychosis. Finally complete recovery.

JOERGEN MOELLER.

55. STENGER. *A report of cases of serous meningo-encephalitis of otitic origin.*

The author is of the belief that lumbar puncture does not furnish us any clue as to the kind or extent of an intracranial process (even if bacteria are found present they are of no diagnostic importance), and that the question of operation is determined by the general picture of the disease with the aid of all the symptoms and diagnostic methods. Three cases of severe cerebral complications are reported which followed chronic suppurations and were operated on without the aid of lumbar puncture. In the first there was a

combination of sinus phlebitis with meningitis and abscess in the posterior cranial fossa. In the second there was a brain abscess in the middle cranial fossa; and in the third an extensive meningitis originated in the labyrinth. In all three cases excellent results following a broad incision in the dura, by which in each case a very large quantity of cerebro-spinal fluid was evacuated, proved that the meningeal symptoms were produced by a serous meningo-encephalitis. The details of these interesting cases must be read in the original. The second case corresponded exactly to the symptom-complex of the acute œdema of the pia as described by Fürstner.

HAENEL.

56. GERBER. *Encephalitis and acute otitis of influenzal origin.*

The report of an unusual case of acute otitis of influenzal origin with associated multiple nerve paralysis (5th, 7th, 8th, 9th, 10th, 11th, and 12th nerves) from encephalitis.

HAENEL.

57. ZERONI. *Operative meningitis.*

Post-operative meningitis in chronic suppurative otitis is usually produced by a latent labyrinth suppuration. The author has collected twenty-nine of these cases, of which three are his own. The meningeal symptoms in three cases appeared at the time of operation, in eight on the day after operation, and in seven on the second day after operation. In fifteen of the twenty-nine cases before operation there was no sign that the condition was aggravated. In fourteen cases, however, there was an exacerbation characterized by the presence of attacks of headache and vertigo. Pathological examinations of the labyrinth revealed the greatest variety of kinds and stages of disease. The path of infection is usually along the internal auditory meatus; less frequently the aqueduct or diseased parts of the labyrinth capsule. Indirect extension of the labyrinth inflammation is caused by the usually present abnormal communications of the labyrinth with the middle ear, particularly through defects in the labyrinth windows. When these communications are absent, abnormal vascular communications between the tympanum

and the labyrinth cavity are assumed to be present. An unfavorable result on operation may lie in the concussion from the chisel or from the gauze packing. Post-operative meningitis may result without labyrinth disease. Of these cases Zeroni has collected eleven. At autopsy the origin of the meningeal affection which could not be diagnosticated in life, was found in a deep-seated focus, not discovered at operation, which alone would have been sufficient to induce meningitis. Paths of infection are formed by pre-formed openings in the dura, such as the sites of the nerves of the carotid and of the lymph vessels. In order to avoid post-operative infection of the meninges a very energetic search should be made in deep-seated extra-labyrinthine affections, while in diseases of the labyrinth the operation should be performed with great caution. The labyrinth should only be opened on threatening symptoms or in the presence of escaping pus from a labyrinthine fistula. The tympanic cavity should be treated with great respect, both in the use of gauze mops and in the use of the chisel. The occurrence of post-operative meningitis should serve as a warning not to delay operation and as a caution in the prognosis in all chronic suppurations where there is a suspicion of labyrinth complications.

HÄNEL.

58. HANSBERG. *Sinus thrombosis and articular rheumatism. A contribution to the connection between the ear and general diseases.*

Hansberg reports three cases of sinus thrombosis which presented the picture of acute articular rheumatism. In the first two cases the patient came too late under the treatment of the aural surgeon, and extensive operations were of no avail. The third patient was saved.

As the symptoms of the articular rheumatism may mask the aural disease, it is possible in these cases to overlook entirely the sinus disease.

Hansberg believes that the pyogenic organisms originating from the sinus thrombosis possessed lessened virulence and thus were not capable of producing general pyæmia.

HOELSCHER.

59. GRADENIGO. *A characteristic symptom of purulent thrombosis of the superior longitudinal sinus.*

The presence of a fluctuating swelling in the vertex in the middle line at the posterior part of the sagittal suture must be regarded as a characteristic symptom of thrombosis of the superior longitudinal sinus. This swelling (dilatation of veins, hematoma, or abscess) may be associated with a dilatation of the veins, œdema of the hairy scalp of the forehead and of the lids. Eleven cases, in addition to the one personally observed, are cited in which the swelling was very tender and contained pus.

HAENEL.

60. IWANOFF. *The opening of the bulb of the jugular vein.*

Of the seven cases operated on by the author, three recovered. Of these the bulb was exposed in only two, but not opened. All the cases were very severe. In all cases of otitic pyæmia with disintegrating thrombosis Iwanoff recommends exposure of the bulb and, in extreme cases, its opening.

SACHER.

61. IWANOFF. *The technique and report of cases of operation on the jugular bulb.*

The author employs a method to expose the bulb of the jugular vein which corresponds exactly to that described by Voss. Resecting the apex of the mastoid is really of secondary importance. A case history is given in which the author evacuated a perisinuous abscess after the method of Grunert, which had extended into the region of the bulb. The sinus itself was not involved in the interior. There were no thrombosis and no pyæmic symptoms.

ZARNIKO.

62. IGLAUER. *A case of mastoiditis complicated with extradural abscess, without history of a discharge from the auditory canal.*

Patient, male aged thirty-seven, had an acute middle-ear suppuration for seven weeks without any evidence of a perforation of the drum, which was followed by acute mastoiditis. A mastoidectomy revealed an extradural abscess in and around the knee of the sinus, from which about a dram of pus was evacuated. The only symptoms present in the

case that might have suggested this complication were severe radiating pain, slowness of cerebration, and nervousness. The recovery was perfect. CLEMENS.

63. BARSTOW. *A case of tympanic and mastoid cholesteatoma; extradural abscess; sinus thrombosis; prolonged pyæmic temperature without metastases; recovery.*

A boy aged twelve had aural discharge and recurrent attacks of pain in the left ear and mastoid, following scarlet fever. The mastoid was opened and thoroughly cleaned out, but the following day a severe chill occurred with a rise of temperature to 104.6° F. The sigmoid sinus was then inspected and a soft gray clot was found extending from the knee to the bulb. Improvement after this operation followed for five days only, then the chills and pyrexia again occurred. The jugular vein was ligated and removed and later the torcular end of the sinus was re-examined and found clear. Thereafter, the case rapidly improved and made a good recovery. The patient was in the hospital eight weeks and four days; pyæmic temperature seven weeks and five days; no metastatic abscesses; thirty-nine chills; highest temperature in axilla 107.8° F., lowest in mouth 96° F., temperature range being 11.8° F. CLEMENS.

64. STARR. *Intracranial lesions as sequelæ of chronic purulent otitis media.*

This paper considers (1) the possible cerebral complications of otitis media, (2) the symptoms which aid in their diagnosis, (3) the proper methods of surgical treatment, and (4) the results of surgical operations for these complications. (1) Cerebral complications are abscess of the brain, meningitis, sinus thrombosis, and to which is now added acute encephalitis. (2) In differentiating between the presence of an abscess and the possibility of meningitis, much emphasis is laid on the examination of the cerebro-spinal fluid obtained by lumbar puncture, and to the examination of the blood. In meningitis the number of leucocytes is enormously increased, while in abscess there is no increase unless a complicating meningitis is present. The blood examination is equally valuable, showing a rapid leucocytosis if meningitis or brain

abscess develops in the course of otitis. Another important point is the rapid rise in the ratio of the polymorphonuclear leucocytes to other elements in the blood, and if the ratio changes from 65 per cent. up to 85 per cent. the probability of a cerebral complication is very great. (3) It is imperative to open the abscess as soon as the diagnosis is made and have the opening large enough for evacuation and drainage. (4) The author found in the literature from 1900 to 1906, out of eighty-one abscesses of the brain secondary to otitis on which operation was performed, forty-two patients recovered.

CLEMENS.

65. OPPENHEIMER. *Mastoiditis and sigmoid sinus thrombosis in an infant.*

The usual symptoms on which a diagnosis of sinus thrombosis following otitis media suppurativa is based, develop so late in an infant or are individually of such little importance, Oppenheimer finds in a study of this case, that the most reliable symptom of this complication is the exaggerated temperature range. He is of the opinion that the temperature should be taken every two or three hours, both day and night.

CLEMENS.

66. BRYANT. *Operative technique and after-treatment for mastoiditis with epidural complications.*

The report of several cases is made to illustrate: (1) the use of the author's front-bent gouge in preference to a mallet-driven instrument, (2) the use of the modified blood-clot, (3) the question of packing the mastoid wound after exposure of the dura mater. The first case: the wound was closed without sutures, the convalescence was very short, and the deformity was reduced to a nearly imperceptible scar. The second case: the wound was packed and left open, and although there was no infection the convalescence was more prolonged and the scar larger.

CLEMENS.

67. HASTINGS, H. *Sinus thrombosis. Two cases with masked symptoms.*

The thrombosis in each case, although of otitic origin, was masked in the first case by coexisting typhoid and in the second by a history of malaria. Chills, fever, and sweats

were not present in either case. The thrombosis in each case was suspected by irregularities in the history, which led to an uncovering of the sinus.

M. TOEPLITZ.

68. BARNHILL, J. F. *The diagnosis of intracranial complications of suppurative ear disease.*

Barnhill saw three acute cases, in all of which the ear disease from the beginning was severe, the pain excessive, and the patient unusually prostrated within a short time, no symptom pointing to brain extension, but without a sign of improvement. In one, the excessive pain led to opening the mastoid, which was neither painful, tender, nor swollen, but was found filled with pus, the pain continuing unabated. Two days later, paralysis of the arm of the opposite side, vomiting, unequal pupils, subnormal temperature and unconsciousness developed. The two other cases were less severe as to pain, mastoiditis was present in each by the tenth day, and symptoms of brain irritation and pressure followed rapidly. Moderate temperature followed by subnormal; accelerated pulse, later very slow; headaches far forward, vomiting, and exaggerated reflexes were seen in all. Only one case showed irregularity of pupil and paralysis of muscles.

M. TOEPLITZ.

69. RICHARDS, J. D. *A case of infective sigmoid sinus thrombosis and jugular vein infection of otitic origin without apparent mastoid involvement in an adult; operation; recovery.*

A male negro, aged nineteen, had an attack of acute suppurative otitis media of the left ear as the sequence of the grippe. Slight sero-purulent discharge ceased on the fourth day; on morning of fifth day complete left facial paralysis, continued until fourteenth day, when found by Richards to be peripheral. No mastoid symptoms, membrana tympani not reddened. Several days previous, complains of constant occipital headaches. Incision of drum, tympanic cavity dry. On fifteenth day, severe chill in hospital, temperature rose to 103.2° and suddenly remitted, followed by profuse sweat. Pulse fell from 88 to 62 during fever. Mastoid bone sclerotic, sinus superficial and exceedingly far forward, knee in contact with posterior canal wall. Antrum contained a few firm red

shot-like granulations. The middle of the vertical sinus limb descended through a patch of purulent dura 0.75 inch in diameter, representing a patch of purulent pachymeningitis not cemented to overlying bone. Vessel resilient, pulsating. It was opened and found obstructed by recent thrombus, invaded by streptococci, not broken down. Spontaneous free-return flows from either end occurred; the diseased external vessel wall was exsected. Four days after the operation, chill, temperature 104° F. Internal jugular vein now ligated low down and with portions of branches resected. Vein appeared normal, but walls of upper portion contained large numbers of streptococci. Wick gauze introduced into proximal end of sinus, carried well down into bulb, was soiled with pus when removed at first dressing. The facial paralysis disappeared by the fifth week. Recovery.

M. TOEPLITZ.

d.—OTHER DISEASES OF THE MIDDLE EAR.

70. JOERGEN MOELLER. On the pathology and diagnosis of otosclerosis. *Nord. med. Arkiv.*, 1905, vol. i., book 2.
71. SUGAR. On the treatment of otosclerosis with phosphorus. *A. f. O.*, vol. lxvi., p. 36.
72. BECK. Tumors of the middle ear with report of two rare varieties. *The Laryngoscope*, Oct., 1905.
73. BLAKE. Vertigo of aural causation. *Boston Med. and Surg. Journ.*, Oct. 5, 1905.
74. BRYANT. Capital operations for the cure of tinnitus aurium. *Journ. Amer. Med. Assoc.*, Dec. 9, 1905.
75. LECOMPTE. The Ménière symptom complex. *Boston Med. and Surg. Journ.*, Oct. 5, 1905.
76. BRYANT. The relation of ear disease to auditory hallucination of the insane. *Annals of Otol., Rhinol., and Laryngol.*, Sept., 1905.
77. OPPENHEIMER. Mastoiditis in infants. *Med. Rec.*, March 10, 1906.
78. OPPENHEIMER. Report of a case of traumatic mastoiditis. *Laryngoscope*, Feb., 1906.
79. WEBSTER. Keloid tumors. *Annals Otol., Rhinol., and Laryngol.*, March, 1906.
80. BECK. Angio-epithelioma of the middle ear. *Illinois Med. Journ.*, Feb., 1906.
81. SPENCER. A case of aneurysm of the middle ear with intact drum-head. *New York Med. Journ.*, March 17, 1906.
82. BERNSTEIN. A case of mastoiditis acutissima. *Detroit Med. Journ.*, Feb., 1906.

83. PFINGST. The course of the facial nerve through the petrous bone and the significance of its injury. *Louisville Monthly Journ. of Med. and Surgery*, March, 1906.

70. JOERGEN MOELLER. *On the pathology and diagnosis of otosclerosis.*

Moeller's views on the functional examination of otosclerosis are those which are usually accepted. Otosclerosis is a disease which invades the middle ear as well as the labyrinth and the corresponding functional results must be present. Instead of finding the triad of symptoms of Bezold characteristic for middle-ear diseases, the following conditions are present: bone conduction abbreviated, Rinne frequently positive though shortened, Gellé negative, lower tone limit slightly diminished, upper tone limit in almost all cases distinctly diminished. This last symptom is of great diagnostic importance. The unsuccessful treatment is mentioned in conclusion. The author has had the best results with vibrations of the drum membrane. MOELLER.

71. SUGAR. *On the treatment of otosclerosis with phosphorus.*

The author concludes as follows:

1. Treatment with phosphorus for spongification in otosclerosis does not seem to be sufficiently well established on a scientific basis.

2. If its success is acknowledged, the way in which the phosphorus is prescribed is not indifferent.

3. The administration of mineral phosphorus for years in doses exceeding the maximal is not without question.

4. The prescribing of the harmless organic phosphorus is of advantage in all cases. HAENEL.

72. BECK. *Tumors of the middle ear with report of two rare varieties.*

After enumerating all the different tumors ever found in the middle ear, Beck reports a case of an angio-endothelioma of the middle ear, attached to its anterior wall, in a woman aged twenty-three years, removed by radical operation. The second case was a true myxoma of the middle ear. A complete bibliography is appended to the paper. M. TOEPLITZ.

73. BLAKE, C. *Vertigo of aural causation.*

Blake states briefly (1) that vertigo of aural causation is

primarily a pressure symptom; (2) that pressure may be exerted upon the labyrinth from without, the middle ear; (3) from within, by invasion of the intracapsular space, as in hemorrhage into the labyrinth; (4) that the effect in intensity and duration upon the semicircular canals of the intralabyrinthine pressure will depend upon the locality and extent of hemorrhage; (5) that recurrent vertigos are the result of an excessive intralabyrinthine vessel-dilatation from suspense of vasomotor inhibition of reflex origin, either alone or with intralabyrinthine persistent pressure of extrinsic or intrinsic origin.

M. TOEPLITZ.

74. BRYANT, W. S. *Capital operations for the cure of tinnitus aurium.*

The indications for operation in grave tinnitus are akin to those found in trifacial neuralgia. Intradural section of the nerve should be done. Suppuration should be stopped before. The source of the tinnitus must be located in or about the labyrinth. A central cause for tinnitus could remain unchanged after operation. After sixty-five auditory neurectomies on the cadaver the technic of the operation is described. From a discussion of the reported cases, of which those of Krause, Wallace, and Parry are given in full, Bryant concludes that, in carefully selected cases of tinnitus with the stimulus located in the peripheral end of the auditory nerve, the section of the eighth nerve, when done with proper technic, gives a good prognosis; also for the cure of aural vertigo.

M. TOEPLITZ.

75. LECOMPTE, W. A. *The Ménière symptom-complex.*

Lecompte reports two cases of Ménière's symptom-complex, the first in a man forty-five years old, who had several severe attacks at intervals of weeks and months, the cause being a high-pressure manner of life. The hearing was not lowered. In the second case, a woman, the cochlea was involved in addition to the static labyrinth, since the deafness persisted in the left ear, after vertigo and subjective noise had disappeared. The cause was an exhaustive condition of a septic puerperium. Vasomotor disturbances in the blood-vessels of the labyrinth, possibly with slight hemorrhages from these vessels, form the lesions.

M. TOEPLITZ.

76. BRYANT, W. S. *The relation of ear disease to auditory hallucination of the insane.*

Auditory hallucinations are often dependent on ear disease. Among fifty-six insane, five were without hallucinations of hearing, four had normal ears, forty-one with hallucinations of hearing, forty-two with abnormal ears (mostly non-suppurative), twenty-seven with tinnitus aurium, ten doubtful cases. The predisposition to the production of hallucination is a psychopathic condition, requiring an exciting cause, usually tinnitus. In four cases the hallucinations ceased after correction of catarrhal conditions of the ears.

M. TOEPLITZ.

77. OPPENHEIMER. *Mastoiditis in infants.*

The history of a nine-months-old child is given to illustrate the absence of prominent symptoms when the antrum is filled with pus. The general symptoms of mastoiditis vary in almost every case and are of value only in occasionally directing suspicion to the affected ear. Often the sole evidences of the ear affection must be gained from a careful study of the child for several days. In conclusion it is suggested that the membrana tympani of all infants be carefully examined notwithstanding the nature of the affection present.

CLEMENS.

78. OPPENHEIMER. *Report of a case of traumatic mastoiditis.*

Case, male aged forty-four, was thrown to the ground and stunned by an explosion of dynamite, but he did not lose consciousness. A sharp pain followed in the left ear, with some hemorrhagic discharge therefrom. The local condition upon examination was found to be similar to the well-known picture following such traumatic influences. A faint tenderness was present over the mastoid region which was intensified on deep pressure. The aural discharge became purulent and profuse. About six weeks after the accident ossiculectomy was performed without benefit. A mastoidectomy performed some ten weeks later showed the antrum and adjacent cells and those of the tip, filled with offensive pus. The removal of carious bone exposed the dura over the sigmoid sinus and middle cerebral region. Directly above the aditus ad antrum

a distinct fissure three-quarters of an inch in length was observed. The case illustrates the futility of conservative treatment both surgical and medical, as applied to the intratympanic space in the attempt to avoid mastoid involvement; the absence of physical and local signs (other than the persistent suppuration) indicating the presence of an extensive disease of the mastoid process.

CLEMENS.

79. WEBSTER. *Keloid tumors.*

Of twenty-one cases of keloid treated by the X-ray, five are here reported apparently cured, fourteen improved, one no marked improvement, and one grew worse. Since the development of the X-ray treatment, cases have been accumulating that show this to be the most effective form of treatment yet tried, excepting, perhaps, that of radium.

CLEMENS.

80. BECK. *Angio-epithelioma of the middle ear.*

Case, female aged twenty-three, with no previous history of any aural disease, had at the age of nineteen slight deafness and some pain in the left ear which was associated with pulsating tinnitus. Three years subsequent to this an examination revealed a growth of a bluish-gray color which filled the entire auditory canal. An attempt to remove the growth with the aural snare under local anæsthesia was unsuccessful on account of the severe pain experienced and the profuse hemorrhage that followed a partial excision. A radical operation was made a month later when the entire tumor was removed. Recovery was rapid although facial paralysis took place three weeks after the operation and it still remains. The microscopical examination states the tumor to be a mass of connective tissue covered with stratified epithelium. The underlying tissue is composed largely of blood-vessels. In certain of these there is a partial or complete filling of the lumen with proliferated endothelial cells. The walls of vessels, except for the endothelium, show some inflammation, but otherwise negative. The endothelium forms plugs in some areas; in others there is a little or no hyperplasia. Diagnosis: angiomatous polyp, with endothelioma tendencies.

CLEMENS.

81. SPENCER. *A case of aneurysm of the middle ear with intact drum-head.*

The case was a girl of twenty-two, who had been complaining of deafness of the right ear accompanied with a pulsation, regular and forcible, for some three months. No history of any serious illness or family taint. The pain was never very severe but the deafness became more and more pronounced. Examination showed that the membrana tympani was bulging considerably, which seemed to merge into the lower canal-wall. The color was dark red; no pulsation could be detected. Paracentesis was performed and following the incision a most alarming hemorrhage occurred, which was stopped with difficulty. Several hemorrhages took place thereafter before the incision closed completely. From the fact that at no time was there any bleeding into the middle ear, or any bleeding into the mouth or nose through the Eustachian tube, it was concluded that the swelling was an aneurysm of the tympanic branch of the middle meningeal artery.

CLEMENS.

82. BERNSTEIN. *A case of mastoiditis acutissima.*

Patient, male aged thirty-three, had general symptoms which were considered due to an attack of gripe, and in twenty-four hours there developed pain in the left ear, severe headache, slightly retracted head, irregular pulse and respiration, the breathing falling as low as nine per minute. There was mental hebetude, although he could be aroused with difficulty. There was no mastoid tenderness or swelling of the integument, but the left drum membrane was deeply inflamed and the upper part of the auditory canal showed slight bulging. There was no optic neuritis or involvement of the eye muscles. The left ear drum was opened, the incision being well carried out into the canal and only a slight quantity of serous fluid exuded, but the relief of all symptoms was instantaneous. As the right ear drum showed inflammatory changes this was opened as well. Improvement followed these operations for about twenty-four hours, then an unfavorable change took place and the patient died. It appears that meningitis developed but thirty-six hours before death, and the entire illness lasted but sixty hours.

CLEMENS.

83. PFINGST. *The course of the facial nerve through the petrous bone and the significance of its injury.*

During the radical mastoid operation, injury to the facial nerve takes place in the descending portion of the facial canal and beyond its exit from the stylo-mastoid foramen during the removal of the tip. Injury to the nerve is not always avoidable in extensive caries and variation in conformation of the bone, nor can it be detected by facial twitching during the operation. Symptoms of facial paralysis appear as soon as the patient is out of the anæsthesia, thereby differing from paralysis caused by neuritis or hemorrhage into the Fallopian canal. Regeneration of the nerve is complete, but when there is a division of the nerve, only partial restoration of function occurs.

CLEMENS

NERVOUS APPARATUS.

84. ALEXANDER and TANDLER. *Examinations of congenitally deaf dogs and cats and of the young of congenitally deaf cats.* *A. f. O.*, vol. lxvi., p. 161.

85. THANISCH. *A case of hysterical deafness.* *A. f. O.*, vol. lxvi., p. 116.

86. VON BEHM. *A case of late hereditary syphilis of both aural labyrinths.* *A. f. O.*, vol. lxvii.

84. ALEXANDER and TANDLER. *Examinations of congenitally deaf dogs and cats and of the young of congenitally deaf cats.*

In the two dogs the principal changes were found in the membranous cochlear canal and in the capsule of the cochlea; defects in the bony septum, degeneration of the papilla basilaris of the cochlea, obliteration of the membranous cochlear canal by complete apposition of the membranous walls. Cochlear nerve and spiral ganglion pathologically changed though very little diminished in size.

In the third dog the principal changes were found in the cochlear nerve and in the spiral ganglion. Bilateral degenerative atrophy of the cochlear nerve and of the saccular nerve, of the spiral ganglion, of the papilla basilaris of the cochlea, and of the macula sacculæ.

Congenital deafness in incomplete albinotic cats showed the following uniform pathological changes, consisting in

hypoplasia of the cochlear nerve and of the spiral ganglion, incomplete development of the stria vascularis. The secondary changes consisted in degeneration of the macula sacculæ and of the papilla basilaris, obliteration of the membranous pars inferior.

HAENEL.

85. THANISCH. *A case of hysterical deafness.*

Together with a simultaneous slight general hyperæsthesia and increased reflex irritability, there was an acute complete bilateral deafness which alternated with an over-sensitiveness of the auditory organ and the cessation of other hysterical symptoms.

HAENEL.

86. VON BEHM. *A case of late hereditary syphilis of both aural labyrinths.*

Notwithstanding the severity and the long course of the affection (the left ear had been affected one year, the right half a year), it was cured by the administration of mercury.

ZARNIKO.

NOSE AND NASO-PHARYNX.

a.—SEPTUM.

87. BOULAI. Two curious cases of correction of a spur of the nose. *Arch. internat. d'otol.*, etc., vol. xxi., p. 132.

88. BALLENGER. The submucous resection of the septum, illustrated. *Penna. Med. Jour.*, March, 1906.

89. WHITE. Resection of the nasal septum. *Boston Med. and Surg. Journ.*, Oct. 12, 1905.

90. HURD. A submucous resection operation for deviation of the nasal septum; with description of several new instruments. *Med. Rec.*, Nov. 25, 1905.

87. BOULAI. *Two curious cases of correction of a spur of the nose.*

The first case was that of a man who himself removed a spur of the septum with a file. The other case was that of a child where a marked deviation of the septum corrected itself in four years.

OPPIKOFER.

88. BALLENGER. *The submucous resection of the septum, illustrated.*

The operation suggested by Ballenger has been performed by him on more than one hundred cases with fair results to his patients and it appears to be well adapted to fully 90 per cent. of all septal deformities requiring surgical correction. There is a complete description of all the instruments employed by him included in the paper. CLEMENS.

89. WHITE. *Resection of the nasal septum.*

White, after giving a full and elaborate history of the operation, concluded from his forty-five resections as follows: The anterior vertical incision extended backward should be chosen. The convex flap should be kept intact. In deflections lying far back a horizontal incision is added to the vertical one. Sutures are optional, but of advantage in extended incisions. Weak solutions of cocaine of 1 per cent. submucously injected are more satisfactory than the stronger. The operation is adapted to all types of deflections and spurs not in children under fourteen years of age. A complete bibliography is appended. M. TOEPLITZ.

90. HURD. *A submucous resection operation for deviation of the nasal septum; with description of several new instruments.*

Hurd uses a slightly curved incision differently placed according to the nature of the deflection, extending from the nasal floor upward and inward to the junction of the septum with the lateral wall. He uses for the incision a Myles septal knife; for elevating the periosteum, an elevator, double ended, one sharp end resembling a Volkmann curette, but filled with metal, the other end of copper, blunt and rounded, flexible; for perforating the cartilage the bone curette; for removing the cartilage, the swivel knife of Ballenger; for separating the two membranes after removal of cartilage, a speculum with a long upper blade and a short lower one; for removing the bony portion, the Gruenwald forceps; for removal of the septal ridge of bone freed from the floor when still attached behind, Hurd uses his own down-cutting forceps. M. TOEPLITZ.

b.—TUMORS.

91. CHAUVEAU. Tonsillar metastases in a case of sarcoma of the nasal fossæ. *Arch. internat. d'otol., etc.*, vol. xxi., p. 209.

92. FAITH. A case of rhinolith. *Laryngoscope*, March, 1906.

93. CAMPBELL. A case of primary syphilitic infection in the nose. *Journ. Amer. Med. Assoc.*, May 5, 1906.

94. DABNEY. Report of a case of adeno-sarcoma of the tonsillar ring. Resection of both external carotid arteries; recovery. *Laryngoscope*, May, 1906.

91. CHAUVEAU. *Tonsillar metastases in a case of sarcoma of the nasal fossæ.*

A woman sixty-nine years of age presented a sarcomatous tumor in the right middle meatus which was radically removed. Two months later a local recurrence took place. This was quickly followed by metastases in both tonsils. The patient died from cachexia one year after removal of the primary tumor.

OPPIKOFER.

92. FAITH. *A case of rhinolith.*

The patient, female, aged seventeen, complained of nasal obstruction, foul discharge, and constant pain in the right side of the head for the past six months. A large unyielding mass was found in the right side, occupying the posterior half of the inferior and middle meatus, which also projected into the post-nasal space. The stone was removed with forceps, was of a dirty-gray color, and had for its nucleus a pearl button five-eighths of an inch in diameter. The button had been inserted fifteen years prior to the examination. The gross weight of the stone was about 100 grains and, with the exception of a slight decrease in the size of the inferior turbinate posteriorly, there was no structural damage done.

CLEMENS.

93. CAMPBELL. *A case of primary syphilitic infection in the nose.*

A surgeon, who was in perfect health, circumcised a patient on whose prepuce was a large indurated chancre. Two months after the operation, he noticed a stuffiness of the right nostril, and severe headaches which extended from the brow across the vertex to the occiput. On examining the nose, a condition was found resembling fibrinous rhinitis, limited to the inferior turbinate, from which there was no ichorous discharge. Eighty days after the probable inoculation a macular rash appeared on the abdomen. There were papules at the base of the uvula, but no congestion or soreness of the

fauces. The glandular enlargement was limited to the sub-maxillary of the right side. After a few mercurial inunctions all evidences of the disease disappeared. CLEMENS.

94. DABNEY. *Report of a case of adeno-sarcoma of the tonsillar ring. Resection of both external carotid arteries; recovery.*

Patient, female 'mulatto, aged fifty-five, tubercular, suffered from distressing tinnitus in the left ear for about one year. Examination showed only a slight hyperæmia of the drum along the malleus and opposite the tympanic orifice of the Eustachian tube. In the fauces the positions of the left lingual tonsil and faucial tonsil were occupied by nodular growths, that of the lingual tonsil extending well down into the tissues overlying the epiglottis. The growths were of a glazed appearance and of a dirty grayish-pink color. The right tonsil was involved as well but not to the same extent. The naso-pharynx was almost completely occupied by a growth in the position of the Eustachian tube and nodular masses were intruding into the left tubal orifice. Microscopical examination of a section showed growth to be adeno-sarcoma. As a palliative measure resection of both external carotids was advised and performed at different times, and the tissues of the fauces soon after became blanched and the growths diminished in size, rendering deglutition and respiration easier and causing improvement in the tinnitus, hearing, and speech. The lymphatics in the region are still enlarged although not as sensitive as before the operation. Six months after, the case appears to be progressing most favorably. CLEMENS.

C.—ACCESSORY SINUSES.

95. VAN DEN WILDENBERG. *On the anatomy of the sinuses of the face. La presse oto-laryngologique Belge*, book 3, 1906.

96. BERENS. *Comparative results of conservative and radical methods in the treatment of sphenoidal sinusitis. Arch. internat. d'otol.*, etc., vol. xxi, p. 97.

97. KOELLREUTHER. *The results of Delsault's operation in empyema of the antrum. München. med. Wochenschr.*, 1906, No. 9.

98. VON BEHM. *An unusual injury of the maxillary antrum by a bullet. München. med. Wochenschr.*, 1906, No. 13.

99. CAPART. Operative indications in the treatment of sinusitis. *La presse oto-laryngologique Belge*, 1906, book 2.

100. HAJEK. On the method of establishing the indications for the surgical opening of the frontal sinus. *Arch. internat. d'otol.*, etc., 1906, p. 1.

101. DELNEUVILLE. A case of ocular complication of sphenoidal sinusitis. *La presse oto-laryngologique Belge*, 1906, book 1.

102. HOFFMANN. Multiple abscesses of the brain following suppurations of the two frontal sinuses of traumatic origin. *Arch. internat. d'otol.*, etc., vol. xxi., p. 79.

103. JOHNSTON. Empyema of the frontal sinus. *Amer. Journ. Med. Science*, Nov., 1905.

104. STUCKY. Case of chronic suppurative ethmoiditis, sarcoma of the right temporo-sphenoidal lobe with misleading symptoms. *Journ. Am. Med. Assoc.*, Apr. 28, 1906.

105. AMBERG. A simple method of finding an easily accessible portion of the lateral sinus. *Journ. Amer. Med. Assoc.*, May 19, 1906.

106. WILSON. Empyema of frontal, ethmoidal, and sphenoidal cells, with abscess in the orbit, serous meningitis, optic neuritis, otitis media. Operation. Recovery. *Laryngoscope*, May, 1906.

107. WOODBURY. Brow ache: frontal sinus congestion with periodical headaches. *N. Y. Medical Journ.*, Apr. 21, 1906.

108. BERENS. The results of operation by way of the maxillary route for combined disease of the maxillary antrum, ethmoidal labyrinth, and sphenoidal sinus. *Ann. Otol., Rhinol., and Laryngol.*, Sept., 1905.

109. COFFIN. The external operation for the relief of ethmoiditis. *Annals of Otol., Rhinol., and Laryngol.*, Sept., 1905.

110. RICHARDS. Personal experiences with empyemata of the frontal sinus. *Amer. Journ. Med. Science*, Nov., 1905.

111. WELLS. The intranasal route in operating upon the nasal accessory sinuses. *Ann. Otol., Rhinol., and Laryngol.*, Sept., 1905.

95. VAN DEN WILDENBERG. *On the anatomy of sinuses of the face.*

1. Unusually large ethmoidal cells situated at the posterior surface of the frontal sinus.

2. Cartilaginous septum in the maxillary antrum which completely shuts off a part of this cavity.

There are two illustrations.

BRANDT.

96. BERENS. *Comparative results of conservative and radical methods in the treatment of sphenoidal sinusitis.*

The author concludes as follows:

Acute uncomplicated empyema of the sphenoidal sinus should be treated conservatively.

Acute multiple sinusitis, including the sphenoidal cavity, may under favorable conditions be treated with conservative means.

Isolated chronic empyema of the sphenoidal cavity can be treated conservatively if it is not accompanied with severe changes in the mucous membrane.

In the latter case and in associated empyema of the other cavities a radical operation is necessary. OPIKOFER.

97. KOELLREUTHER. *The results of Delsault's operation in empyema of the antrum.*

Of sixty-six patients who were operated upon according to Delsault's method in the Rostock Ear Clinic, sixty-one were cured. This favorable result is especially to be ascribed to the careful after-treatment. The diseased mucous membrane was removed as thoroughly as possible. SCHIBBE.

98. VON BEHM. *An unusual injury of the maxillary antrum by a bullet.*

The bullet entered the canine fossa and partly penetrated the inferior meatus. The consecutive suppuration of the maxillary antrum was rapidly cured by operation.

SCHIBBE.

99. CAPART. *Operative indications in the treatment of sinusitis.*

Capart puts the following three questions: 1. Are intracranial complications frequent in cases of sinusitis which are not operated upon? 2. Is it not possible that certain operations produce complications in the interior of the skull? 3. Can complications in the interior of the skull be prevented by operation?

1. After reviewing the literature, the author concludes that fatal complications of accessory-sinus diseases may occur but that they are extremely rare. We are not justified in inducing a patient to submit to an operation with the statement that carries threatens his life, nor may we assure him of the absolute lack of danger of his trouble.

2. The unfortunate result in a series of operations should make us cautious in cases where the complaints of the patients are in no relation to the danger of an operation.

3. This caution is still more in place because brain symptoms almost always prophesy death.

The results obtained by operation unquestionably will be important, but operation should be reserved for cases where a complication threatens or where the subjective symptoms of the patient demand it.

BRANDT.

100. HAJEK. *On the method of establishing the indications for the surgical opening of the frontal sinus.*

Some authors perform the radical operation on the frontal sinus too frequently and neglect endonasal treatment. By resecting the middle turbinal the radical operation of the frontal sinus can frequently be avoided. Hajek cites two cases of beginning orbital abscess where for some other reason a radical operation was deferred and after resection of the middle turbinal, much against expectation, there was an immediate improvement and complete recovery.

As the indications for radical operation are not the same for all operators, various authors show great differences in the number of their operative cases. Mermoud has trephined one hundred and sixty-five frontal sinuses, while Hajek, notwithstanding an average material of 6000 patients a year, has only performed this operation twenty-three times during the last twelve years.

If cerebral complications are present, or are to be feared, the radical operation should be recommended if the headache and suppuration continue notwithstanding endonasal treatment. If, however, after endonasal treatment the headache disappears and there is no purulent discharge, it is necessary to individualize whether to suggest the radical operation or not.

OPPIKOFER.

101. DELNEUVILLE. *A case of ocular complication of sphenoidal sinusitis.*

Notwithstanding diminution of vision on both sides and central scotoma for colors, these symptoms disappeared after treating a purulent inflammation of the sphenoidal cavity. The author draws attention to the importance of examining the nose in these cases.

BRANDT.

102. HOFFMANN. *Multiple abscesses of the brain following suppurations of the two frontal sinuses of traumatic origin.*

A sailor twenty-one years of age was struck by a rudder on the forehead. Following this accident there was an empyema of both frontal sinuses. Two years later death from brain abscess. At the autopsy there was a meningitis at the base and convexity and four frontal abscesses. The one was situated on the right side and in direct communication with the right frontal sinus. The posterior wall of the frontal cavity was absent and there were granulations on the dura. The three abscesses on the left side developed by infection extending through the blood or lymph passages. The abscess pus contained streptococci. OPPIKOFER.

103. JOHNSTON. *Empyema of the frontal sinus.*

The case reported by Johnston illustrates the so-called closed empyema of the frontal sinus, in which at no time could a discharge of pus into the nose through the fronto-nasal canal be detected. The patient, aged thirty years, two weeks after a mild attack of grip had had severe pains over the left eye, occurring regularly every other day, beginning at 12 noon, or between 12 and 4 P.M., lasting from five to six hours, not when quiet, but after walking or excessive exercise. The periodicity of the attacks, the dryness of the nasal mucous membrane, and extreme tenderness on percussion led to the diagnosis of suppuration of the left frontal sinus. On opening the very thick anterior wall there was a gush of pus; the mucous membrane was degenerated and covered with granulations. No necrosis. Pus showed the staphylococcus pyogenes aureus in pure culture. M. TOEPLITZ.

104. STUCKY. *Case of chronic suppurative ethmoiditis, sarcoma of the right temporo-sphenoidal lobe, with misleading symptoms.*

Patient, male, aged fifty-one, occasionally had copious discharges from the nose for many years past. Recently there occurred severe pain in the frontal region, nausea, mental depression, and insomnia. Slight pressure or tapping over frontal sinus caused excruciating pain. Transillumination showed the right frontal and maxillary sinuses involved. During the course of the next three days, aphasia, slight convulsions of the right hand and arm, deviation of the tongue

to the right, more bulging of the right eye, and stupor developed. Upon opening the frontal sinus the lining membrane was found greatly thickened and the naso-frontal duct occluded by granulations. The maxillary sinus was found blocked by firm tissue which involved the nasal wall and the floor of the orbit. Autopsy showed the whole right temporo-sphenoidal lobe adherent over base, and on section it appeared to be replaced by an encapsulated, mottled, red and gray mass of semi-solid pasty consistence. Microscopical examination showed tumor to be sarcoma, both round and small spindle cells being found. The whole tumor was far advanced in process of degeneration with evidence of inflammatory infiltration and necrosis, the indication being that the infection had extended from the nasal accessory sinuses. CLEMENS.

105. AMBERG. *A simple method of finding an easily accessible portion of the lateral sinus.*

The lateral sinus can be found when we open that part of the mastoid process which is located in the direction of a line which equally divides the angle formed by the linea temporalis and the anterior border of the mastoid process (an angle of about 115°). CLEMENS.

106. WILSON. *Empyema of frontal, ethmoidal, and sphenoidal cells, with abscess in the orbit, serous meningitis, optic neuritis, otitis media. Operation. Recovery.*

Patient, male, aged thirty, had nasal catarrh for two years, and during the past two weeks has suffered much pain in the head and over the left frontal sinus. Examination of the left eye showed marked papillitis and blindness in nasal half of the field. There was a large perforation in the left ear drum from which pus was flowing. Operation by Killian's method revealed necrosis of the anterior and posterior ethmoidal cells. In the region of the posterior cells, the orbital wall was necrotic and a hole was found about the size of a dime from which pus escaped. Lumbar puncture was made and although the spinal fluid was clear, it spurted out as if it was under some pressure. On the ninth day, the drum had healed, and in a little over a month the patient had fully recovered, vision in the left eye being $\frac{3}{8}$. CLEMENS.

107. WOODBURY. *Brow ague: frontal sinus congestion with periodical headaches.*

Brow ague is not considered a neuralgia of the classical type, although there is a disturbance of the vasomotor nerve trunks. No spots of tenderness will be found along the course of the nerve trunks. Certain individual susceptibility seems to be involved since the same degree of congestive swelling may be present in other patients without causing the same amount of pain and discomfort. It is pointed out that the pain is always increased on bending the body forward, as in picking anything from the floor. Swelling and congestion of the nasal mucosa are invariably found, especially on the middle turbinate. A careful examination of the nose in cases of periodical headache is advised. CLEMENS.

108. BERENS, T. P. *The results of operation by way of the maxillary route for combined disease of the maxillary antrum, ethmoid labyrinth, and sphenoid sinus.*

The twenty operated cases show the following results: Eleven cases have been cured: seven for two years, two for one year, one for six months, one for four months. Three of these were cases of unilateral pansinusitis. Five cases with atrophic mucous membranes before operation, two of which were specific and with frontal-sinus disease, were vastly improved. Four cases had "tic douloureux," nine grippe, and four coryza. Fifteen had interference with the sense of smell, one a stricture of the tear duct. Two have disappeared from observation. M. TOEPLITZ.

109. COFFIN, L. A. *The external operation for the relief of ethmoiditis.*

In operation upon the ethmoids two principles should be guiding: 1. All diseased parts or cells must be reached. 2. No healthy part should be sacrificed and, therefore, where most anterior cells are diseased, or the ethmoidal cells extend over the orbit, and in children previous to the descent of the second teeth, an external opening through the nasal process of the superior maxilla or through the os planum is the operation of necessity. This method should not be used, unless the anterior cells were involved, except in children. M. TOEPLITZ.

110. RICHARDS, G. L. *Personal experiences with empyemata of the frontal sinus.*

Of fifteen cases cited elaborately by Richards, ten were operated upon: In seven the sinus was opened at the inner angle of the eye, nasal drainage established with subsequent closure of the external wound after a varying period, the so-called Ogston-Luc method or some modification of it. Of these two showed a cure without recurrence, four had one or more recurrences with final cure, one was certainly cured by obliteration, the others probably; one is still under treatment. Three cases were treated by the method of obliteration, and of these there have been no recurrences. The cases which showed recurrence were all accompanied by more or less ethmoidal suppuration or occurred in connection with maxillary-antrum suppuration. As to the choice of operation, Richards urges first to try the intranasal method of treatment, then, in simple suppuration, not long-continued, the simple opening and draining the sinus with closure of the external wound. In cases associated with ethmoidal or even those of the other sinuses, some form of the obliteration method is chosen; but which, whether Jansen's, Coakley's, Killian's, can hardly be determined, until the patient is on the table and the sinus opened, according to the extent of the pathological condition and the cosmetic result expected.

M. TOEPLITZ.

111. WELLS, W. A. *The intranasal route in operating upon the nasal accessory sinuses.*

The objections to the employment of the nasal route in the treatment of the accessory sinuses are: That it is not practicable, viz., in some cases; that valuable time is lost postponing radical measures, which is most commonly urged against conservative treatment; that the nasal methods are generally slow and tedious; that they are uncertain as to results. However, a great many cases get well under conservative treatment. If a true sinusitis can be established with reasonable certainty and if chronic polypoid changes have already taken place, an immediate radical operation is indicated. In all other cases the nasal route should be given a trial. Then the different intranasal routes to the maxillary antrum, ethmoid cells, the frontal, and sphenoid are separately and fully discussed.

M. TOEPLITZ.

d.—OTHER NASAL AFFECTIONS.

112. SCHILLING. *A new method of rhinoplasty.* *Norsk magasin for lægevidensk.* 1906, p. 94.

113. HANAU. *The treatment of hay-fever with serum.* *Arch. internat. d'otol.*, etc., vol. xxi., p. 134.

114. HEYNINX. *A scintillating scotoma and hypertrophy of the middle turbinal.* *Arch. internat. d'otol.*, etc., vol. xxi., p. 206.

115. KAHLER. *Supernumerary tooth in the nose; a contribution to the question of high palate.* *Wiener klin. Wochenschr.*, No. 40, 1905.

116. INGALS and FRIEDBERG. *The treatment of hypertrophic and intumescent rhinitis.* *Annals Otol., Rhinol., and Laryngol.*, March, 1906.

117. KOPETZKY. *The diagnostic significance of headache in diseases of the ear, nose, and throat.* *N. Y. and Phil. Med. Journ.*, Dec. 2, 1905.

118. SOMERS. *The antitoxin treatment of hay-fever.* *Laryngoscope*, May, 1906.

119. GRIFFIN. *Turbinectomy.* *Medical Record*, Apr. 14, 1906.

120. HARRIS. *Eucain lactate as an anæsthetic for operations on the nose and throat.* *American Medicine*, Dec. 30, 1905.

121. WEIGERT-STERNE. *The treatment of hay-fever.* *N. Y. and Phil. Med. Journ.*, Oct. 28, 1905.

122. DUFFEE. *New nasal snare.* *Journ. Amer. Med. Assoc.*, Apr. 7, 1906.

112. SCHILLING. *A new method of rhinoplasty.*

The method of Fritz Koenig (implantation of a piece of the concha auris) gave good results in three patients.

JOERGEN MOELLER.

113. HANAU. *The treatment of hay-fever with serum.*

The author is in favor of Dunbar's serum treatment, which has been of service to him in a number of cases.

OPPIKOFER.

114. HEYNINX. *A scintillating scotoma and hypertrophy of the middle turbinal.*

Report of two cases of hypertrophy of the middle turbinal with simultaneous scintillating scotoma. The latter symptom disappeared after correction of the nasal trouble.

OPPIKOFER.

115. KAHLER. *Supernumerary tooth in the nose; a contribution to the question of high palate.*

A man twenty-nine years of age with defect of the nasal

septum presented about one-half inch from the introitus a white structure which proved to be a root of a tooth. The position of the tooth was demonstrated by an X-ray picture. The extraction was difficult and the tooth was swallowed.

The unusual height of the hard palate depended on the fact that it was not properly incorporated, as the congenital syphilis had destroyed the cartilaginous and the bony septum.

WANNER.

116. INGALS and FRIEDBERG. *The treatment of hypertrophic and intumescent rhinitis.*

Fifty cases of rhinitis hypertrophica and fifty cases of the intumescent form of rhinitis were selected for the purpose of demonstrating the value of the galvano-cautery in the treatment of these conditions. The observations had been carried sufficiently far to serve as a reliable basis of comparison, and the conclusions reached are: That the cautery is one of the best if not the best method for treating these conditions. The dangers of middle-ear infection have been exaggerated, no such complication having occurred in any of this class of cases. Adhesion formation will not occur if the mucous membrane of the opposite side is not injured. If the cauterization is linear, very little mucous membrane is destroyed. Scab and crust formation does not occur oftener than following other forms of nasal operations. No packing of the nose is needed to prevent hemorrhage.

CLEMENS.

117. KOPETZKY, S. J. *The diagnostic significance of headache in diseases of the ear, nose, and throat.*

After having pointed out in a general way some of the characteristics of headache in the domain of general medicine, Kopetzky deals more closely with headaches whose causes are the ear, nose, and throat. Cephalalgia pharyngo-tympanica is due to acute and chronic middle-ear disease. A series of headaches referable to the ear are "reflex neuroses," showing themselves in migraine. Nasal headache is due to general hyperæsthesia of the nasal mucous membrane. Diffuse headaches are a stable characteristic of involvement of accessory sinus disease; with an acute exacerbation, neuralgic

pains, localizing themselves in the neighborhood of the affected part, take their place. M. TOEPLITZ.

118. SOMERS. *The antitoxin treatment of hay-fever.*

A larger experience with the antitoxin of Dunbar has given the author the following results: It produces prompt and positive amelioration of the symptoms in a large majority of the cases, and in a smaller number this is accompanied with complete disappearance of the affection for that season. Where slight or no action follows its use, is either due to its improper administration or to some idiosyncrasy. It favorably influences all the manifestations of hay-fever in the larger number of cases, while in a smaller class one or more of the symptoms seem to be influenced. When given during an attack, it produces palliation rather than a cure. When successfully used during one season, it does not prevent the occurrence of the disease the following season, although there does appear to be a slight influence in modifying future attacks. It is effective in both liquid and powder form but the latter is preferable. CLEMENS.

119. GRIFFIN. *Turbinectomy.*

Griffin does not believe in complete turbinectomy and advises where the operation is required that only sufficient bone should be removed to restore the normal calibre of the canal. The great objection the author has to complete turbinectomy is, that it makes the passage too large and removes something that has a function to perform. Partial turbinectomy, on the other hand, only restores the normal anatomy. Where it has been found that infection of the ears is present, the operation has given relief and caused improvement in the deafness beyond dispute. Up to the present he has operated on over ten thousand cases and in all the aim of the operation has been secured. CLEMENS.

120. HARRIS, T. J. *Eucaïn lactate as an anæsthetic for operations on the nose and throat.*

Harris considers beta eucaïn lactate an excellent substitute for cocain. It may be employed in the strongest solutions without fear of toxic symptoms. Its anæsthetic power is not quite so great as cocain; a 15 per cent. to 20 per cent. solution

of eucaïn lactate would correspond to a 10 per cent. solution of cocain. For injections, 20m. to 30m. of a solution of eucaïn is used.

M. TOEPLITZ.

121. WEIGERT-STERNE, L. *The treatment of hay-fever.*

Since the toxic proteid of pollen is readily disintegrated by alkalies, Weigert-Sterne recommends the use of sodium bicarbonate in powder or saturated solution, which will ameliorate the attack of hay-fever, provided the toxine already absorbed has been entirely eliminated.

M. TOEPLITZ.

122. DUFFEE. *New nasal snare.*

The special feature of this instrument is the pistol-grip handle, which allows the operator an unobstructed view and an easy natural position of the hand and fingers. It is made from nickled tubular brass, is well reinforced, is strong and durable. A description of the instrument is given in full.

CLEMENS.

6.—NASO-PHARYNX.

123. MOURE. Adenoid vegetations in the new-born. *Allgemeine Wiener medicinische Zeitung*, No. 52, 1905.

124. LANGE. On enuresis as a neuropathic condition depending upon adenoid vegetations. *Wiener med. Presse*, No. 52, 1905.

125. FEIN. The removal of the pharyngeal tonsil with a bayonet-shaped adenotome. *Wiener med. Wochenschrift*, Nos. 45 and 46, 1905.

126. ROUSSET and ROYET. Psychical disturbances of a rhinopharyngeal organ. *Arch. internat. d'otol.*, etc., vol. xxi., p. 92.

127. STEIN. A case of congenital membrane in the naso-pharynx. *Wiener klin. Rundschau*, No. 42, 1905.

123. MOURE. *Adenoid vegetations in the new-born.*

If the suckling cannot breathe or take the breast and respiration is interfered with, the operation can be performed 14-20 days after birth. Otherwise it is better to wait till the seventh or eighth month. The best instrument is Gottstein's with the modification of Delstanche. As it is impossible to remove everything in the skull, it is better to see the children at about the fifth year again. If the operation is undertaken during the period of weaning it is possible to observe the re-formation of the naso-pharyngeal follicles in a short time. Consequently the operation should be performed only in threatening cases.

WANNER.

124. LANGE. *On enuresis as a neuropathic condition depending upon adenoid vegetations.*

The author has observed thirty-nine children who suffered from enuresis. The age varied from three to ten years; boys were affected twice as often as girls. In eight cases there were adenoid vegetations, in three hypertrophic nasal catarrh. After removal of the pharyngeal tonsil there was no result in seven and a doubtful one in one case. Hence the author believes that the accepted theory that enuresis depends upon adenoid vegetations is incorrect; he believes that the condition depends upon a neuropathic condition and recommends arsenic; iron, and iodine.

WANNER.

125. FEIN. *The removal of the pharyngeal tonsil with a bayonet-shaped adenotome.*

The author describes the advantages of his instrument over the others. Narcosis is unnecessary.

WANNER.

126. ROUSSET and ROYET. *Psychical disturbances of a rhino-pharyngeal organ.*

The melancholic thoughts and attempts at suicide of this patient disappeared after the division of the adhesion in the nasopharynx.

OPPIKOFER.

127. STEIN. *A case of congenital membrane in the nasopharynx.*

A patient twenty-eight years of age was treated on account of deafness for catarrh of the tubes. Posterior rhinoscopic examination revealed behind the choanæ a grayish red membrane which permitted a view into the nasal cavity through two oval openings through which the lower and middle turbinals could be observed. The membrane was adherent to the posterior end of the septum. From the roof of the pharynx this membrane descends and covers the tubal prominence, so that on performing the air douche the air did not enter into the tubes. This membrane is supposed to have been congenital.

WANNER.

SOFT PALATE, PHARYNX, AND MOUTH.

128. BAIASCHESKI. *A case of complete adhesion of the soft palate to the posterior pharyngeal wall with simultaneous atrophy of both tonsils.* *Russkij Wratsch*, No. 31, 1905.

129. RENNERT. *Tuberculosis of the tonsils, a further contribution*

to treatment with the new tuberculin. *Deutsche med. Wochenschrift*, No. 3, 1906.

130. SOMMER. The treatment of abscess of the tonsil. *Munch. med. Wochenschr.*, 1906, No. 11.

131. LAUB. A peculiar change of the tongue in cardiac insufficiency. *Wiener med. Wochenschrift*, No. 10, 1906.

132. WRIGHT. Cysts in lymphatic tissue, an exceptional manifestation of tonsillar retrogression. *The Laryngoscope*, September, 1905.

133. TODD. Extirpation of the faucial tonsil. *St. Paul Med. Journ.*, December, 1905.

134. RICHARDSON. Gangrene of the tonsil. *Amer. Journ. Med. Science*, October, 1905.

135. SMITH. An operation for cleft palate. *American Journ. Surgery*, March, 1906.

136. ROBERTS. A new instrument for excision of the tonsils. *Laryngoscope*, March, 1906.

137. SCHADLE. Correct treatment of syphilitic adhesions between the soft palate and the posterior wall of the pharynx. *St. Paul Medical Journ.*, March, 1906.

128. BAIRASCHEWSKI. *A case of complete adhesion of the soft palate to the posterior pharyngeal wall with simultaneous atrophy of both tonsils.*

There was a perforation of the hard palate. Following this there was an adhesion to the posterior wall of the pharynx. The atrophy of the tonsils is also explained by the extension of the syphilitic ulceration. SACHER.

129. RENNERT. *Tuberculosis of the tonsils, a further contribution to treatment with the new tuberculin.*

In a case of tuberculosis of the tonsils which was difficult to diagnosticate there was a white membrane which covered the tonsil, which was in no way characteristic of tuberculosis. The diagnosis was, however, proven by the microscopic examinations and the animal experiments. Treatment with the new tuberculin led to recovery. The author does not consider this a case of primary tonsillar tuberculosis, because the patient had suffered for a long time before the onset of the throat affection with a lung trouble and involvement of the lymphatic apparatus. NOLTENIUS.

130. SOMMER. *The treatment of abscess of the tonsil.*

Recommendation of the tonsillotome as the best means of opening tonsillar abscesses. SCHEIBE.

131. LAUB. *A peculiar change of the tongue in cardiac insufficiency.*

The author observed in a patient twenty years of age, suffering from insufficiency of the mitral valve and stenosis of the left venous ostium, regularly with the onset of the acute insufficiency changes in the tongue which disappeared as soon as the heart's action returned to normal. The tongue would then be swollen, the mucous membrane relaxed and broken with numerous furrows. At the margin of the tongue and also on the dorsum of the tongue there were a number of spots which looked like ulcers and which were surrounded by a grayish yellow wall. They were painless. On the administration of digitalis the symptoms disappeared in two days, to recur after an interval of 14-20 days. The symptoms are supposed to have been due to the insufficiency of the tricuspidalis.

WANNER.

132. WRIGHT. *Cysts in lymphatic tissue, an exceptional manifestation of tonsillar retrogression.*

A large amount of oily substance escaped from the lymphoid tissue of the naso-pharynx of a woman aged twenty-one. In the specimen the cavity had been ruptured, and having no true walls it could not be recognized, but several smaller cavities containing fat cells were seen.

M. TOEPLITZ.

133. TODD, F. C. *Extirpation of the faucial tonsil.*

Todd removes in the majority of cases the faucial tonsils under a general anæsthetic, dropping the head over the end of the table. He grasps the tonsil with the tonsil forceps, dissects with tonsil knives the tonsil loose from the anterior pillar, taking care not to injure the pillar, from which most hemorrhages arise. With a pair of slightly curved scissors the tonsil is separated above and below, pulling it out all the time; the forceps is then released and the cold wire snare applied. Bleedings from the cut pillar are stopped by ligating the pillar.

M. TOEPLITZ.

134. RICHARDSON, C. W. *Gangrene of the tonsil.*

Richardson reports two cases of gangrene of tonsil, which together with three other cases given by him in abstracts are the only cases found by him in medical literature. The first

case, a man of forty-five, an alcoholic, had 'a marked infiltration of the right side of the neck, then a discharge from nose and mouth, followed by subsidence of swelling and thin white spots on the right tonsil. No improvement from antitoxin. On the ninth day delirium, on the tenth peculiar odor of sloughing tissue. On the right side the tonsil, anterior and posterior pillar down into the pharynx was one continuous mass of grayish, brownish, putty-like slough with a complete line of demarcation between the normal and necrotic tissue. Death on the tenth day.

M. TOEPLITZ.

135. SMITH. *An operation for cleft palate.*

The operation suggested has for its purpose not only the closure of the cleft, but the actual production of a new muscular velum and all the requirements of deglutition and phonation. Ten cases have been operated upon in the way described with satisfactory results.

From the anterior end of the cleft an incision is made running outward and a little backward toward the alveolus about one-third distance to the teeth, where the incision is changed, then it is carried in a straight line nearly to the posterior extremity of the alveolar process. Sufficient tissue must be left where the incision ends for the blood supply of the flap. A corresponding incision is made on the opposite side, the two flaps with the periosteum are dissected up from the bone and are freed from the posterior edge of the palate bones behind. A curvilinear incision is now made on each side beginning near the last molar where the preceding incisions terminate, keeping close to the roots of the teeth. Two triangular flaps are thus formed of mucous membrane and periosteum which are carried into the median line and sutured. The freshened edges of the velum are now sutured and the posterior edges of the anterior flaps are sewn to the middle of the newly-formed velum. Tension is guarded against by extra sutures.

CLEMENS.

136. ROBERTS. *A new instrument for excision of the tonsils.*

The cutting part of this instrument is patterned after the jaws of the old-fashioned steel trap and is adjustable for

right or left, up or down. The bite is directed outward toward the base of the tonsil, and its depth is easily regulated by pressure on the handle of the instrument. The blades are so shaped as to easily pass in between the pillars of the fauces without any possible injury thereto. CLEMENS.

137. SCHADLE. *Correct treatment of syphilitic adhesions between the soft palate and the posterior wall of the pharynx.*

The device here suggested and advised is composed of an obturator and a palatine plate, made preferably of vulcanite, which is designed to hold the obturator in place by means of dental clasps. The apparatus is to be continually worn in order to keep apart permanently the opposing surfaces of the soft palate and postpharyngeal wall. It should never be introduced, however, until the acute symptoms and tissue necroses have subsided. In the chronic cases the device should be immediately employed after complete detachment of the adhesions. The author's method of operation and the details for making the obturator are described in detail.

CLEMENS.

REPORT ON THE PROGRESS IN OTOTOLOGY DURING THE SECOND QUARTER OF 1906.

BY PROF. ARTHUR HARTMANN, BERLIN.

Translated by Dr. ARNOLD KNAPP.

ANATOMY AND PHYSIOLOGY,

138. FREY. On the anatomy of the temporal bone. *Arch. f. Ohrenheilk.*, vol. lxxviii., p. 41.

139. GAUDIER and DESCARPENTRIES. The anatomy of the mastoid vein. *Annales des mal. de l'oreille, etc.*, December, 1905.

140. WAGENER. The function of the ceruminal glands. *Charittannalen*, vol. xxx., Jahrgang.

138. FREY. *On the anatomy of the temporal bone.*

This paper deals with the outlines of the three parts of the temporal bone (the squamous, the petrous, and the tympanic parts), as they appear in an adult. These parts are easily separated from one another in the new-born. Later they become firmly adherent and the limits are frequently to be distinguished only with difficulty. In this particular bone of an adult the divisions between these three areas were distinctly seen as they were loosely attached to one another. The temporal bone is carefully described with the aid of very successful pictures and the topographical peculiarities are given.

ZARNIKO.

139. GAUDIER and DESCARPENTRIES. *The anatomy of the mastoid vein.*

This is a very careful study. The mastoid vein after leaving the sigmoid sinus passes through the mastoid emissary in a direction from before backward and carries its blood to the occipital venous plexus which is covered by the splenius muscle. Varieties in its development frequently occur. This is especially of importance to the aurist, who is apt to come in conflict with the vein in searching for a cerebellar

abscess. It may vary in size from the thickness of the small finger to complete absence.

BOENNINGHAUS.

140. WAGENER. *The function of the ceruminal glands.*

Many ceruminal glands contain fat, though the fat is attached only to the pigment granules in the cells. There is no fat to be seen in the lumen of the glands. Consequently we cannot affirm that the ceruminal glands produce cerumen. This is probably the product of the sebaceous glands in the auditory canal.

The function of the ceruminal glands, on the other hand, is to carry away the cerumen. The cerumen mixes readily with the watery fluid secreted by the ceruminal glands, and this furnishes enough fluid for the canal.

The pigment of the ceruminal glands is not secreted. It is morphologically and chemically different from the pigments in cerumen itself which is the result of the disintegration of the fat.

HARTMANN.

GENERAL.

a.—REPORTS.

141. IMHOFER. *Diseases of the ear and throat in idiots.* *Selbstverlag.* Wien.

141. IMHOFER. *Diseases of the ear and throat in idiots.*

Imhofer examined 108 inmates and found thirty-six with enlarged pharyngeal tonsils, in twenty-six they were of a middle size, in forty-six the tonsils were small. Of seventy-four inmates who could be examined for their hearing, thirty-six heard 51.36 per cent. beyond whisper at 6 m. Fourteen inmates suffered from deafness which was an inconvenience in study.

HARTMANN.

b.—GENERAL PATHOLOGY AND SYMPTOMATOLOGY.

142. WAGNER. Demonstration of sequestrum of the temporal bone obtained during a mastoid operation. *Annals Oto., Rhino., and Laryng.*, June, 1906.

143. SMITH MACCUE. An unusual growth of the mastoid process, fibro-chondro-osteoma of the mastoid antrum. *Annals. Oto., Rhino., and Laryng.*, June, 1906.

144. BLOCH. Dythyric deafness. *Deutsch. Arch. f. klin. Med.*, vol. lxxxvii.

145. KATZ. So-called otosclerosis in the cat. *A. f. O.*, vol. lxxviii., p. 122.

146. VOSS. The bacillus pyocyaneus in the ear. *Veröffentl. a. d. Gebiete d. Militär-Sanitätswesens*. Berlin, 1906, Verl. A. Hirschwald.

147. LERMOYEZ. Affections of the ear produced by the bacillus pyocyaneus. *Ann. des mal. de l'oreille, etc.*, October, 1905.

148. BÁRÁNY. On counter-rotation of the eyes induced by the aural labyrinth in those with normal ears, in the deaf and deaf-mutes. *A. f. O.*, vol. lxviii., p. 1.

149. BECHTEREW. An unusual auditory and acoustic palpebral reflex. *Obosrenje psichiatrit, neurologii i eksperimentalnoj psichologii*, 1905, book 2.

142. WAGNER. *Demonstration of sequestrum of the temporal bone obtained during a mastoid operation.*

Patient, male, aged forty, fell from his wagon striking the back of his head. He bled from the nose, ear, and mouth, was unconscious for several hours, and had pain and intense swelling back of the left ear. At the time seen by the writer (two months after the accident) there was considerable discharge from the ear. During an extensive mastoid operation a sequestrum was found in its petrous portion. It measures 2 cm. long and 1 in width. Whether it was formed by the process of streptococcic osteomyelitis or by fracture, or by both, is difficult to determine. CLEMENS.

143. SMITH MACCUEEN. *An unusual growth of the mastoid process, fibro-chondro-osteoma of the mastoid antrum.*

Patient, boy aged sixteen, several years ago had had measles, and later typhoid fever from which no aural complication followed. At the operation the entire mastoid process was of the eburnated variety until the antrum was reached, which gave the impression that the case was of the usual chronic variety notwithstanding the statements of the family to the contrary. The antrum and tympanic cavity were extensively involved in the necrotic process, while the malleus and the incus had become disintegrated. The tumor was located in the inferior and anterior part of the antrum, and filled the concavity caused by the more or less drooping of the canal adjacent to the hyperostosis. The specimen was an ovoidal mass 1 cm. long, 0.6 cm. wide, and 0.3 cm. thick; weight 0.2 gm. Surface smooth, glossy, slightly nodular, and greyish-pink in color. The tissue is hard at some points

and soft and elastic at others. Microscopical report is included in the paper. CLEMENS.

144. BLOCH. *Dysthyric deafness.*

After examining clinically 100 persons suffering with goitre, Bloch originates Dysthyric Deafness, which in its most marked stages passes directly into cretinic deafmutism. Dysthyric deafness is a nervous deafness and the anatomic situation is probably to be found beyond the labyrinth. Prognosis must be guarded. Treatment with thyroid tablets should be continued through the entire life. BRUEHL.

145. KATZ. *So-called otosclerosis in the cat.*

In a cat twenty-three years of age which had never borne kittens and in whom in the last years deafness with the presumable presence of subjective tinnitus was observed, the following conditions were found on microscopic examination: Bilateral extensive old otosclerosis, not only of the labyrinth capsule but in the other parts of the temporal bone. The areas are to a great extent united though many still remain disseminated. The joint surfaces of all the ossicles are free. There is a distinct partial degeneration and atrophy of the cochlear nerve. Very marked disappearance of the ganglion cells in the lower and partly in the middle whorl of the cochlea. Corti's organ in the lowest turn is distinctly atrophic, while it is normal in the upper areas. There is ankylosis of the stapes. There are, moreover, sarcomatous tumors in the abdomen and in the midbrain.

The author then repeats his views on the characteristics of otosclerosis. He believes that the bone disease which leads to osteoporosis is a constitutional one usually of an inherited nature (rheumatic-gouty diathesis, syphilis, scrofulosis, neuroparalysis). On the basis of this disposition a number of exciting causes may produce the otitis, such as catarrhs of the middle ear, occlusion of the tube, affections of the nasopharynx.

Regarding treatment, the author warns against too frequent treatment, especially against intratympanic injections. He recommends warm baths, anti-rheumatic mineral waters, arsenic, cod-liver oil, phosphorus. Cold-water treatment is distinctly contra-indicated. ZARNIKO.

146. VOSS. *The bacillus pyocyaneus in the ear.*

The author has endeavored to solve the pathogenesis of the bacillus pyocyaneus in the ear. He finds that this bacillus occurs in a variety of ear diseases in the auricle, the auditory canal, middle ear, and mastoid process as a saprophyte or as a pathogenic organism. The pathogenesis is proven from the microscopic and bacteriologic presence of this organism in the discharge and when the disease is cured after the bacillus has been destroyed; moreover, by successful inoculations and by agglutinative tests. Only in the more advanced stages of a severe inflammation of the auricle, as occurs principally after the radical operation, certain peculiarities in the clinical course seem to depend upon the presence of the pyocyaneus. One of the most active means of combating this infection is pure boric acid.

BRUEHL.

147. LERMOYEZ. *Affections of the ear produced by the bacillus pyocyaneus.*

If the yellowish pus in chronic purulent otitis becomes bluish-green, a secondary infection with pyocyaneus is present. This has a tendency to cause a very painful diffuse inflammation of the meatus with or without a croupous exudate, or perichondritis, which may lead to a deformity of the auricle as is observed after the radical operation. The pyocyaneus rarely invades the healthy ear, though it may primarily produce a purulent otitis. The exudate in that case is characterized by its sero-sanguinolent nature. So-called idiopathic perichondritis, according to Lermoyez, is nothing but a primary infection of the perichondrium by the pyocyaneus. He has endeavored to show in the case of the rabbit the tendency the pyocyaneus has to affect the perichondrium.

BOENNINGHAUS.

148. BÁRÁNY. *On counter-rotation of the eyes induced by the aural labyrinth in those with normal ears, in the deaf and deaf-mutes.*

Counter-rotation of the eyes is a peculiar movement of the eyeballs which appears when the head is moved from its upright position towards one shoulder. The eyeballs under these circumstances do not preserve their position in the

orbit but perform a rotation in an opposite direction to the head. Transient and permanent counter-rotations are distinguished. The transient rotation is a symptom of a rotary system which occurs during the turning of the head. The permanent counter-rotation continues in the new position of the head. The latter has been examined in this paper.

A peculiar instrument has been constructed in order to observe and to measure this rotation. Nineteen normal and thirty-two patients suffering from the ears, but without vertigo, were examined. Both showed no differences. With the aid of these fifty-one cases the pathological cases (fifty-five) are compared.

The results are as follows: 1. In the presence of a one-sided destruction of the vestibular apparatus, examination of counter-rotation does not show us anything. We have better methods of examination which show us indubitably the destruction on one side. 2. If the vestibular apparatus is destroyed on both sides, the examination of rotation of the eyes confirms the results which have been obtained with certainty by other methods. 3. Of clinical importance is an examination of counter-rotation in those cases which suffer from vertigo. A single examination sometimes in these cases may show that an organic cause is present for the vertigo, while a frequently observed normal condition of counter-rotation suggests simulation or neurosis. Therefore the examination of counter-rotation is of importance in forensic cases, where it may even be decisive. On the other hand, it is of importance to differentiate an organic from a neurotic vertigo and thus help us in the treatment.

Theoretically the author believes that the counter-rotation emanates partly from the vestibular apparatus. In opposition to Nagel, he thinks it very likely that the nerve terminals are situated in the semicircular canals. ZARNIKO.

149. BECHTEREW. *An unusual auditory and acoustic palpebral reflex.*

This reflex, described in 1903, consists in a closure of the lids on an unexpected noise and is supposed to pass along the collateral tracts leading from the central tracts of the auditory nerve to the nucleus of the facial nerve. The investigation

of this question on clinical material has shown that this reflex is of some importance in cases where deafness is simulated. In other cases where deafness is of labyrinthine origin and in those where deafness is caused by an affection of the central distribution of the auditory nerve within the skull the reflex is absent. In cases of peripheric lesions of the facial nerves the reflex is diminished on the side of the lesion, while in central facial paralysis it is usually preserved. An exaggeration of the auditory reflex was observed in cases of hyperæsthesia of the auditory nerve which sometimes is observed in catarrhal affections. In some cases of progressive paralysis the two auditory reflexes on the two sides proved uneven. In certain functional neuroses, especially in hysteria, the reflex is somewhat exaggerated. SACHER.

C.—METHODS OF EXAMINATION AND TREATMENT.

150. BLEGVAD. On Rinne's test, and on the determination of the duration of perception of tuning-forks. *A. f. O.*, vol. lxvii., p. 280.

151. CHAVANNE and TROUILLIEUR. Intracranial section of the auditory nerve. *Annales des mal. de l'oreille*, etc., Sept., 1905.

152. MATTE. Operations on the labyrinth on account of annoying tinnitus in sclerosis. *Deutsche med. Wochenschr.*, No. xxi., 1906.

153. NEUMANN. On local anæsthesia in aural surgery. *Deutsche med. Wochenschr.*, No. 15, 1906.

154. LOHNERG. On the treatment of mouth-breathing and chronic occlusion of the tubes with extension of the palate after Schroeder. *Deutsche med. Wochenschr.*, No. 18, 1906.

155. SONDERMANN. Further experience with my nasal aspirator. *Arch. f. Laryngol.*, vol. xxvii., book 3.

156. LENNHOFF. Tamponade of the nose and of the nasal pharynx. *Arch. f. Laryngol.*, vol. xviii., book 1.

157. ONODI. A syringe to use with hard paraffin. *Arch. f. Laryngol.*, vol. xviii., book i.

158. UFFENORDE. Experience with Merk's stypticin cotton. *Arch. f. Laryngol.*, vol. xviii., book 2.

159. FINDER. Alypin in rhino-laryngologic practice. *Berl. klin. Wochenschr.*, 1906, No. 5.

150. BLEGVAD. On Rinne's test, and on the determination of the duration of perception of tuning-forks.

Rinne's test is usually performed by observing after striking the same tuning-fork the difference of perception between the air- and bone-conduction. This has the very great advantage

that the size of the instrument employed is of no importance. Notwithstanding, the author objects to this proceeding because in certain cases the same tuning-fork in the same individual may give a positive and a negative result of this test. He pleads, therefore, to make use of the fundamental numbers in their true values. Here it is necessary to always begin with the same incipient amplitudes. It must be taken for granted that an examiner has had a certain amount of practice in striking the tuning-fork to equalize the differences which are likely to be sources of error. A number of very excellent mechanical devices have been adopted to serve this purpose. The author, nevertheless, has thought it necessary to construct a new instrument of this kind. In this case the tuning-fork is set in vibration through the blow of a pendulum which always falls from the same height after the release of a spring. After the blow has been struck, the tuning-fork is released from the apparatus and is applied to the ear or to the bone of the patient to be examined.

The reviewer thinks this apparatus is unnecessarily complicated and that the chance of errors is greater than in the ordinary procedure. The rapidity with which the tuning-fork is released from the apparatus must produce a loss of a certain amount of tone and exert an influence on the result of the test.

ZARNIKO.

151. CHAVANNE and TROUILLIEUR. *Intracranial section of the auditory nerve.*

In insupportable tinnitus and vertigo the auditory nerve may be divided as a last resort. In the case of the author, the dura was lifted from the upper surface of the petrous pyramid, the upper wall of the internal auditory meatus was chiselled away, and the nerve was isolated in the canal and divided. Death three days later. No autopsy. The case of Parry was operated on in the same manner. The auditory nerve, however, was only partly destroyed because the result was only a partial one, while the facial remained permanently paralyzed. In the case of Wallace and Marriage it was attempted to find the auditory nerve after dividing the dura and retracting the brain from the petrous pyramid. Death three weeks later: softening of the cerebellum; a thin

strand of the auditory nerve proved to be undivided. The bad prognosis is explained by the inaccessibility of the auditory nerve. It would seem to the reviewer very much easier to endeavor to destroy the terminal distribution of the nerve by curetting the labyrinth after a radical operation and after the labyrinth has been opened.

BOENNINGHAUS.

152. MATTE. *Operations on the labyrinth on account of annoying tinnitus in sclerosis.*

After some introductory remarks on the characteristics of otosclerosis, the case-history of one man is given who was so annoyed by the subjective noises in his ear as to think of suicide. Under these conditions the author decided to open the labyrinth according to Passow, hoping thereby to give the patient some relief. The patient seemed to be permanently and nearly completely relieved of the tinnitus. The hearing was at first improved but later returned to the condition it was in before the operation. The operation was performed as follows: Under chloroform narcosis, an opening 3mm in size was made directly underneath the stapes adjoining the round and oval windows. This permitted the introduction of a Kessel curette and the Schwartz tenotomy probe and the vestibule was curetted. A slight escape of endolymph was noticeable. The course of healing was undisturbed and the symptoms of vertigo were unimportant.

NOLTENIUS.

153. NEUMANN. *On local anæsthesia in aural surgery.*

Neumann believes from his experience that Braun's statement that local anæsthesia is not of service in major ear operations is incorrect, and insists, contrary to von Eicken, that his method furnishes complete anæsthesia of the drum and of the tympanic mucous membrane, so that the operation on the drum, including extraction of the hammer and anvil, may be performed, and that even complete exenteration of the middle-ear cavities may be performed in almost all cases without pain. In order to anæsthetize the middle-ear cavities, the cocain-adrenalin solution is heated to 50° C. and injected in the region of the upper bony canal wall. In operations in

the mastoid process the injecting needle is first introduced down to the bone and then straight forward. A quantity of 3-4ccm. is sufficient to render the operation free from pain.

NOLTENIUS.

154. LÖHNBERG. *On the treatment of mouth-breathing and chronic occlusion of the tubes with extension of the palate after Schroeder.*

It is well known that a narrow nose, even without swelling of the mucous membrane and without adenoids, leads to mouth-breathing, occlusion of the tubes, and deafness. An apparatus has been produced by a dentist which in the course of six months to a year exerts a steady and increasing pressure on the hard palate whereby it becomes more shallow and the respiratory fissure of the nose is dilated. One case has been observed which has been treated by this method with very good success.

NOLTENIUS.

155. SONDERMANN. *Further experience with my nasal aspirator.*

The author has found that the scabs in ozæna are easily displaced. Acute suppurations of the accessory cavities are cured after one to two weeks. One case of chronic empyema was also cured by this method.

VON EICKEN.

156. LENNHOF. *Tamponade of the nose and of the naso-pharynx.*

All objections to packing the nose are avoided by the use of Lennhoff's tampon. This is a strip of gauze which is knotted at the end introduced. There is a thread connected with the knot round which the remainder of the strip is wound. The knot is introduced through the nose into the naso-pharynx and swells from the blood. On pulling on the thread, the knot becomes firmly caught in the choanæ. On pulling this thread as much of the gauze strip is introduced into the nose as is necessary to arrest the bleeding.

VON EICKEN.

157. ONODI. *A syringe to use with hard paraffin.*

The syringe can be boiled and permits the injection of hard paraffin in a fine thread.

VON EICKEN.

158. UFFENORDE. *Experience with Merk's stypticin cotton.*

This is a recommendation of stypticin cotton for dispensary use, especially after operations on the lower turbinals.

VON EICKEN.

159. FINDER. *Alypin in rhino-laryngologic practice.*

In union with others the author finds alypin to have the following advantages:

1. Lessened toxicity.
2. The solution may be sterilized by boiling.
3. Its vaso-dilator action is contrasted with the vaso-constrictor action of cocain.

The author recommends either the application of a 20 per cent. solution or the submucous injection of a 1 per cent solution with adrenalin. Alypin seems well suited for endolaryngeal surgery, as it has the same effect as cocain and is not so unpleasant.

MUELLER.

EXTERNAL EAR.

160. RICARD. The surprises of cerumen. *Arch. internat. d'otol.*, etc., vol. xxi., p. 45.

160. RICARD. *The surprises of cerumen.*

In three old people after removal of cerumen there was a distinct diminution of hearing. The author believes that in these cases the articular connections in the middle ear had become loose on account of the patients' age and owing to the pressure of the wax the hearing was improved.

OPPIKOFER.

MIDDLE EAR.

a.—ACUTE OTITIS MEDIA.

161. CHAUVÉAU. Mastoiditis of nurslings without apparent involvement of the tympanum. *Arch. internat. d'otol.*, etc., vol. xxi., p. 469.

162. LANNOIS. Relapsing and alternating facial paralysis of otitic origin. *Ann. des mal. de l'oreille*, etc., July, 1905.

161. CHAUVÉAU. *Mastoiditis of nurslings without apparent involvement of the tympanum.*

A number of cases of mastoiditis are described which occurred in nurslings where there was no apparent involvement of the tympanum. The author explains this isolated

inflammation of the antrum in the early age by the insufficient development of the air cells and the large quantity of blood-vessels and cellular elements which surround the antrum. According to the reviewer, these were probably cases of pneumococcus otitis in which the inflammatory process in the tympanum healed rapidly and continued in the antrum.

OPPIKOFER.

162. LANNOIS. *Relapsing and alternating facial paralysis of otitic origin.*

Facial paralysis coming on in the course of a middle-ear catarrh of favorable prognosis probably occurs more frequently than we imagine and is due to an extension of the inflammation through a dehiscence in the facial canal. A case is described in which the paralysis occurred after a fresh attack of catarrhal otitis, and two other cases are mentioned, in the first of which a right-sided and then left-sided paralysis set in. The otitic origin could only be demonstrated for the left side.

BOENNINGHAUS.

b.—CHRONIC SUPPURATIVE OTITIS.

163. MAHU. *The simplest after-treatment in the radical operation. Ann. des mal. de l'oreille, etc., July, 1905.*

164. IWANOFF. *Subsequent inflammations in the cavity of the ear left after radical operation. A. f. O., vol. lxxviii., p. 63.*

165. KANDER. *The disturbances of the sensation of taste in chronic purulent otitis, especially after operations. A. f. O., vol. lxxviii., p. 69.*

166. BOURGUET. *The surgery of the labyrinth. Annal. des mal. de l'oreille, etc., Sept., 1905.*

163. MAHU. *The simplest after-treatment in the radical operation.*

Eeman's method of after-treatment without packing and the insufflation of boric acid after the posterior membranous canal wall has been resected, has been simplified by the author by omitting the insufflations of boric acid because this powder in the beginning sometimes pains. Adhesions and incomplete obliterations of the operative cavity are prevented by the use of the curette and cauterization but not always successfully. (This occurs also in the cases which are treated with packing.) The method therefore does not apply to cases of cholesteatoma or tuberculosis. Of four uncompli-

cated cases, two recovered in five weeks, three in eight to ten weeks.

BOENNINGHAUS.

164. IWANOFF. *Subsequent inflammations in the cavity of the ear left after the radical operation.*

In the first of these three cases, one year after the operation a cyst-like tumor developed in the posterior wall of the operative cavity. This contained a tenacious colloid brown mass. Under the microscope there were red blood cells, polynuclear leucocytes, cholesterol crystals, shapeless clumps of albumen. The thin-walled cyst was lined with a stratified pavement epithelium which became horny in the periphery. The origin of this cyst cannot be determined. On the other two sides there were cholesteatomatous tumors which required after-operation. In one, in addition, there was an aspergillus mycosis present.

ZARNIKO.

165. KANDER. *The disturbances of the sensation of taste in chronic purulent otitis, especially after operations.*

After a detailed discussion of the chorda tympani and of the tympanic plexus in their relations to the sensation of taste and touch, fifty personal observations are described which were made in the ear clinic at Freiburg. They were all cases of chronic purulent otitis and cholesteatoma or those which had been operated upon for these troubles.

Four qualities of taste were tested: sour (acetic acid), salty (salt solution), bitter (quinine), sweet (simple syrup). An application was made with these substances to the edge and dorsum of the tongue, in front, in the middle, and at the root; then the soft palate, the palatal arch, and the posterior pharyngeal wall. In some cases the electric current was used, and finally the sensibility for tickling and thermic irritants was examined.

The results are the following: 1. The chorda tympani is the nerve of taste for the anterior two-thirds of the tongue. (This is generally accepted.) 2. The tympanic plexus supplies the posterior third of the tongue, the soft palate, the palatal arch, and the posterior pharyngeal wall. (This is also generally accepted.) 3. Complete destruction of these nerves produces a defect in taste, a lesion or an alteration

in the sensation of taste, or the absence of after-taste. 4. Brücke's theory of the specific energy of the sense organs holds also for the sense of taste. It can be demonstrated in diseases of the tympanum when the nerves of taste are also involved. 5. The chorda tympani is frequently diseased in chronic suppurations of the middle ear. In complete destruction of the chorda there is a distinct destructive process, usually cholesteatoma. Notwithstanding severe diseases in the surrounding parts, the chorda may be preserved or only slightly changed, so that the presence of taste in the terminal area of the chorda does not designate the severity or extent of disease in the middle ear. 6. The tympanic plexus may be more or less injured in purulent otitis. 7. The chorda tympani is always torn in extraction of the hammer and anvil. 8. In the so-called radical operation this nerve is always destroyed. The tympanic plexus is rarely completely destroyed, but generally more or less disturbed. 9. The disturbances of the sensation of taste after the radical operation are constant and irreparable. 10. Subjective sensations of taste and feeling in the tongue after operations depend probably upon irritative conditions of the chorda. 11. The chorda tympani and the tympanic plexus are pure nerves of taste. The occasional diminution of the sensation of touch, in parts where taste has become lost, presumably means that with the sensation of taste there is a delicate perception of tactile and thermic sensations. 12. In the use of the electric current, the reaction of taste is only perceived as sensation of taste where the other reagents are also noted.

ZARNIKO.

166. BOURGUET. *The surgery of the labyrinth.*

A complete study with clear drawings. The opening of the labyrinth from the back (Jansen) is not to be recommended on account of the possible injuries to important structures in the depth, such as the jugular bulb, the superior petrosal sinus, and the facial nerve in the internal auditory meatus. The opening from the outer side (Hinsberg and Botey) is as follows: (a.) Opening of the cupola of the vestibulum, then the beginning of the external and anterior semicircular canals. Whenever the external semicircular canal joins the

vestibule at the inner side (12 per cent.), instead of above the facial nerve, injury to this nerve may occur through a slipping of the burr. It can be avoided by a protector like the one suggested by Stacke, which is placed in the oval window.

(b.) Extensive resection of the promontorium. If the carotid is displaced, injury to this structure may be possible, but an opening of the canal is usually heralded by moderate bleeding from the venous carotid plexus.

BOENNINGHAUS,

C.—CEREBRAL COMPLICATIONS.

167. POUTOPPIDAN. Otitic cerebellar abscess and its treatment. *Habilitationschrift*, Kopenhagen, 1906, p. 200.

168. LANNOIS and PERRETIÈRE. Paralysis of the abducent nerve of otitic origin. *Arch. internat. d'otol.*, etc., vol. xxi., p. 798.

169. HEINE. Prognosis of otitic meningitis. *Berl. kl. W.*, 1906, No. 4.

170. LAVAL. On the operative exposure of the bulb of the jugular vein. *A. f. O.*, vol. lxvii., p. 241.

171. LAURENS. Bulb thrombosis. *Ann. des mal. de l'oreille*, etc., August, 1905.

167. POUTOPPIDAN. *Otitic cerebellar abscess and its treatment.*

This paper is based upon two cases, one operated on with success, the other with autopsy. The author has been able to collect nineteen other cases observed in Denmark. The book is based principally upon the literature extant, though a number of topographic and anatomic studies are described which are of some interest. The chapter on operative treatment is the most important. The author is opposed to Koerner's advice not to enter the cranial cavity at the time of the first operation when the bone next to the dura and the dura are healthy. The bone covering the dura and the dura are frequently perfectly normal in cases of brain abscess as well as in sinus phlebitis and in epidural abscess. If in the course of a middle-ear suppuration there are chills, jumping temperature, or high continuous fever, and when an optic neuritis appears, then at the very first operation the skull must be opened, and, when no distinct diagnosis is present, the posterior cranial cavity must first be explored. The author recommends

the opening of the cerebellum through the mastoid process in front of the transverse sinus. The appearance of the dura and the condition of brain pulsation are not of any value for diagnosis of a brain abscess. JOERGEN MOELLER.

168. LANNOIS and PERRETIÈRE. *Paralysis of the abducent nerve of otitic origin.*

A right-sided chronic purulent otitis in a patient thirteen years of age led to severe headache, fever (38.5°), and a right-sided paralysis of the abducent nerve. The operation disclosed a perisinuous abscess. Gradually the paralysis improved, but after ten weeks it had not completely disappeared. OPPIKOFER.

169. HEINE. *Prognosis of otitic meningitis.*

Heine believes that our conception of purulent meningitis as divided into diffuse and circumscribed should be abandoned. He follows Lexer in distinguishing between circumscribed, acute progressive, and the general form of infection. The latter is to be diagnosticated when the lumbar puncture is not only clouded but directly purulent and contains bacteria. The prognosis of this variety is absolutely bad, but there are unquestionably cases of circumscribed purulent meningitis which have gotten well, and there are probably also some of the acute progressive variety. MUELLER.

170. LAVAL. *On the operative exposure of the bulb of the jugular vein.*

This is a plea for Grunert's operation on the jugular bulb. The method advised by Voss is regarded as being of no advantage but suffers from several distinct disadvantages. The description which the author gives is very thorough and lucid. It is a pity that there are not a few drawings. ZARNIKO.

171. LAURENS. *Bulb thrombosis.*

This is a readable, exhaustive treatment of the subject. Of interest and new is the following: In injecting fluid into the jugular vein in the cadaver, either from above or below, the post-mortem clots which are situated in the cupola of the bulb remain. This goes to show that it is impossible to properly cleanse the bulb without exposure. The author operates

according to Grunert's method, though he endeavors to attack the bulb from a posterior aspect rather than from the side, and does not resect the entire mastoid process but only its posterior half, whereby the facial is more protected. The patient operated upon according to this method was cured.

BOENNINGHAUS.

NERVOUS APPARATUS.

172. PANSE. Twelve temporal bones belonging to seven cases of congenital syphilis. *A. f. O.*, vol. lxviii., p. 31.

173. RHESE. On the involvement of the inner ear after concussion of the head. *Deutsche med. Wochenschr.*, No. 6, 1906.

174. CORNET. Disturbances of equilibrium of labyrinthine origin in the course of malaria. *Arch. internat. d'otol.*, etc., vol. xxi., p. 809.

172. PANSE. *Twelve temporal bones belonging to seven cases of congenital syphilis.*

In three of the temporal bones the author found marked changes in Corti's organ similar to the conditions found in deaf-mutes. In many cases there was enormous hyperæmia and extravasation of blood. In one case there was a perforation of pus through the oval window. ZARNIKO.

173. RHESE. *On the involvement of the inner ear after concussion of the head.*

The author has carefully examined the ears in 100 persons suffering from an injury to the head, and believes he has discovered a symptom-complex which even after years will give a distinct clue to the preceding injury. These symptoms are: vascularization along the upper wall of the canal, nystagmus, diminution of bone conduction, similarity of the hearing relief on both sides, disturbance of the hearing duration in the middle tones, while the hearing acuity has suffered but little. All patients are excluded who have been troubled with the ear before the traumatism. NOLTENIUS.

174. CORNET. *Disturbances of equilibrium of labyrinthine origin in the course of malaria.*

This is the case of a soldier who after a severe infection with malaria exhibited pronounced disturbances of equi-

librium. This was apparently due to an affection of the left labyrinth and disappeared on the use of quinine.

OPPIKOFER.

NOSE AND NASO-PHARYNX.

a.—GENERAL.

175. POLYAK. *On the use of hyperæmia in diseases of the upper respiratory passages.* *Arch. f. Laryngol.*, vol. xviii., book 2.

176. CALAMIDA. *Blood pressure in individuals suffering from nasal stenosis.* *Arch. internat. d'otol.*, etc., vol. xxi., p. 485.

175. POLYAK. *On the use of hyperæmia in diseases of the upper respiratory passages.*

Fifty-six cases of various affections of the upper respiratory passages were treated with hyperæmia. The congestion seemed to be of value in tuberculosis of the lungs, and the pain on swallowing was very much diminished. These observations do not permit a final opinion as to the value of hyperæmia, though they are in favor of further experiments.

VON EICKEN.

176. CALAMIDA. *Blood pressure in individuals suffering from nasal stenosis.*

The chapter on the pathological physiology of nasal respiration includes the results of the examination of the blood pressure in occluded nasal respiration. For this purpose persons suffering from hypertrophy of the turbinals, polypi, and hypertrophy of the pharynx were made use of. The blood pressure was measured with the apparatus of Riva-Rocci. This measurement gave in most cases of occluded nasal respiration no distinct changes in the blood pressure. In completely occluded noses there was a transient or permanent increase of pressure.

OPPIKOFER.

b.—OZÆNA.

177. PUTSCHKOWSKI. *Galvanocautery in ozæna.* *Wratschebnaja Gasetta*, 1906, No. 13.

178. DE NAVRATIL. *On the value of submucous injection of paraffin in ozæna.* *Arch. internat. d'otol.*, etc., vol. xxi., p. 459.

177. PUTSCHKOWSKI. *Galvanocautery in ozæna.*

Three cases are described in which cauterization of the

nasal turbinals gave good results. These results, however, may be explained by the inflammatory reaction after the cauterization and are presumably only temporary.

SACHER.

178. DE NAVRATIL. *On the value of submucous injection of paraffin in osena.*

The favorable action of submucous injection of paraffin is based on only five cases. The author uses the instrument recommended by Brockaert and Lermoyez. OPPIKOFER.

C.—TUMORS OF THE NOSE.

179. MAGNUS. *Congenital benign intranasal tumors.* *Arch. f. Laryngol.*, vol. xvii., book 3.

180. TORHORST. *So-called bleeding polypi of the nasal mucous membrane.* *Arch. f. Laryngol.*, vol. xviii., book 2.

181. PEGLER. *Pathology and treatment of bleeding polypi of the septum.* *Arch. internat. d'otol.*, etc., vol. xxi., p. 814.

182. TRAUTMANN. *Carcinoma of the interior of the nose.* *Arch. f. Laryngol.*, vol. xvii., book 3.

179. MAGNUS. *Congenital benign intranasal tumors.*

A review of the cases occurring in literature and report of a single personally observed case. In a boy four months old a fleshy polyp as large as a plum was removed from the nose which was attached to the lower turbinal.

VON EICKEN.

180. TORHORST. *So-called bleeding polypi of the nasal mucous membrane.*

Report of thirteen cases of microscopic examinations and the complete literature.

VON EICKEN.

181. PEGLER. *Pathology and treatment of bleeding polypi of the septum.*

The clinical picture and the pathology of the bleeding septum polyp are given and also the relation between this form of polyp and the malignant new growths is studied.

OPPIKOFER.

182. TRAUTMANN. *Carcinoma of the interior of the nose.*

The tumor, an epithelial carcinoma, developed after injury originating in the sphenoidal sinus, extending into the nasal

cavities and into the naso-pharynx without invading the other accessory cavities. VON EICKEN.

d.—NASAL SEPTUM.

183. FREER. Submucous window resection of the septum. *Arch. f. Laryngol.*, vol. xviii., book 1.

The attempt of Freer to thoroughly remove all the destroyed parts of the septum is excellent, though his impression that this can be done after Killian's method is erroneous. The reasons which he gives are more theoretic than practical. The submucous resection of the septum is an operation which demands considerable technical skill. Nevertheless the operation can, even in the difficult cases, be performed in twenty minutes, and frequently in a very much shorter time if Killian's suggestions are followed. VON EICKEN.

e.—DISEASES OF THE ACCESSORY SINUSES.

184. SCHUERCH. The relation of the size of the antrum of Highmore to the individual skull, and its practical importance in the treatment of suppurations of the maxillary antrum. *Archiv f. Laryngol.*, vol. xviii., book 2.

185. MENZEL. Experimental irrigation of the maxillary antrum. *Archiv f. Laryngol.*, vol. xvii., book 3.

186. HAJEK. A study of the path of infection in a rhinogenic-cerebral complication. *Arch. f. Laryngol.*, vol. xviii., book 2.

187. CHAUVÉAU. Traumatic uncomplicated perforation of the maxillary sinus. *Arch. internat. d'otol.*, etc., vol. xxi., p. 541.

188. CHAUVÉAU. Syphilis of the maxillary sinus. *Arch. internat. d'otol.*, etc., vol. xxi., p. 904.

189. SEBILÉAU. The Lamorier-Delsault operation formerly and now. *Annal. des mal. de l'or.*, etc., Dec., 1905.

190. OKOUNEFF. Spasms of the upper eyelid; symptoms of an exudative inflammation of the frontal sinus. *Arch. internat. d'otol.*, etc., vol. xxi., p. 796.

191. CAPART. The operative indications in the treatment of sinusitis. *Arch. internat. d'otol.*, etc., vol. xxi., p. 401.

192. GUISEZ. Submucous injection of paraffin after operations for nasal empyema. *Ann. des mal. de l'oreille*, etc., Dec., 1905.

193. HENRICI. On the technique of probing the frontal sinus. *Arch. f. Laryngol.*, vol. xvii., book 3.

194. IWANOW. On the radical operation of the frontal sinus. *Chirurgija*, Oct., 1905.

195. ONODI. Mucocoele of the ethmoidal labyrinth. *Arch. f. Laryngol.*, vol. xvii., book 3.

196. KLEIN. The methods of operating for inflammation of the frontal sinus, with report of 13 cases operated on according to Killian. *Inaug.-Diss.*, Königsberg, 1905.

197. THOMPSON. Two cases of fatal frontal sinusitis. *Ann. des mal. de l'oreille*, etc., Nov., 1905.

198. BENTZEN. A case of rhinogenic pyæmia. *Hospitalstidende*. No. 17, 1906.

199. STOECKEL. Broad endonasal opening of the sphenoidal cavity with the burr. *Arch. f. Laryngol.*, vol. xvii., book 3.

184. SCHUERCH. *The relation of the size of the antrum of Highmore to the individual skull, and its practical importance in the treatment of suppurations of the maxillary antrum.*

Neither the configuration of the entire skull nor that of the face, nor the relative size of the superior maxilla gives us any clue as to the size of the maxillary antrum. The floor of the maxillary cavity is situated low down more frequently in men than in women and is usually associated with large alveolar and palatal depressions. Elevation of the floor of the maxillary cavity is especially frequent in narrow and high palates. The opening of the maxillary antrum from the alveolus and from the lower meatus of the nose may be difficult. The cavity may even be so small that an instrument introduced through the lower meatus may not strike the cavity at all.

VON EICKEN.

185. MENZEL. *Experimental irrigation of the maxillary antrum.*

To determine whether fluid injected into the maxillary antrum can enter the frontal and ethmoidal sinuses experiments were made by the author on cadavers. He found that when the frontal and ethmoidal sinuses were open only a slight pressure was required in order to induce the fluid from the maxillary antrum into these cavities. If, however, they were closed, no fluid entered on the greatest pressure. We, therefore, in the living need not fear in irrigating the maxillary antrum to induce the fluid into the frontal sinus. This would only be possible if the frontal sinus had a communicating fistula or if by an opening in the septum it communicated with the frontal sinus on the opposite side.

VON EICKEN.

186. HAJEK. *A study of the path of infection in a rhinogenic-cerebral complication.*

Hajek describes the various ways in which a cerebral complication occurs after suppuration of the nasal accessory cavities, and gives the exact microscopic analysis of the way in which purulent meningitis followed an endonasal operation. This fatal complication resulted from infection along the blood current. Streptococci were found in the swollen mucous membrane of the ethmoid labyrinth and in its blood-vessels; also in the blood-vessels of the dura which communicated with those of the ethmoid. The bony tissue was normal.

VON EICKEN.

187. CHAUVEAU. *Traumatic uncomplicated perforation of the maxillary sinus.*

Report of a case of penetrating injury of the maxillary sinus. The external wound was situated 2cm below the eye. On closing his mouth and nose the patient was able to expel the air through this opening. The wound healed without producing a suppuration of the cavity.

OPPIKOFEK.

188. CHAUVEAU. *Syphilis of the maxillary sinus.*

The patient had suffered from syphilis eight years before, and was not properly treated. He had been suffering from discharge from the left side of his nose for several months. Transillumination showed a disease of the maxillary antrum. All local treatment was abandoned. Treatment by injection with benzoate of mercury produced recovery in two weeks.

OPPIKOFEK.

189. SEBILEAU. *The Lamorier-Delsault operation formerly and now.*

This long paper shows that the author endeavors to resect as much as possible of the facial wall in empyema of the maxillary antrum, removes the mucous membrane completely, does not suture, and there is no after-treatment. Apparently this plan always leads to recovery, and, notwithstanding no after-treatment, seems to give better results than the report of the Clinic in Rostock. The author is one of the few French rhinologists who does not follow Luc's operation, with right in the reviewer's experience. He also objects to the division of maxillary suppurations which is now accepted

in France, namely into empyemas (collections of pus of dental origin) and abscesses (true inflammation of the sinus).

BOENNINGHAUS.

190. OKOUNEFF. *Spasms of the upper eyelid; symptoms of an exudative inflammation of the frontal sinus.*

After an attack of influenza there were symptoms of blepharospasm which were limited to the left upper eyelid. After three weeks the trouble disappeared, and the following day a large quantity of clear fluid escaped from the left nose. Unquestionably the blepharospasm was dependent upon the inflammation of the frontal sinus.

OPPIKOFER.

191. CAPART. *The operative indications in the treatment of sinusitis.*

After meeting with a case of osteomyelitis of the cranial bone which developed after a double radical operation of the frontal sinuses, the author believes that we should not be too ready to operate in affections of the accessory cavities, especially not in those cases where the symptoms of the patient are in no relation to the inconvenience and danger of this method of treatment. Moreover, he has found that fatal complications in affections of the accessory cavities only exceptionally are present, and that consecutive endocranial inflammations are rarely amenable to operative treatment.

OPPIKOFER.

192. GUISEZ. *Submucous injection of paraffin after operations for nasal empyema.*

After clearing out the ethmoid labyrinth the nasal passages are dilated. The formation of scabs can be to a certain extent prevented by diminishing the size of the nasal lumen. For this purpose paraffin is injected under the mucous membrane of the floor of the nose and of the septum. There are four cases reported.

BOENNINGHAUS.

193. HENRICI. *On the technique of probing the frontal sinus.*

To probe and irrigate the frontal sinus Henrici recommends probes and cannulae of a semicircular curve. VON EICKEN.

194. IWANOW. *On the radical operation of the frontal sinus.*

The demands which we must place on the radical operation for frontal sinus empyema are the following:

1. Good cosmetic result.
2. Favorable conditions for contraction in size of the frontal sinus.
3. Accessibility to the ethmoid labyrinth and a broad communication into the nose.

These demands are all met by Killian's operation. The technique of this operation is carefully described and illustrated by a drawing. The author has operated on three cases.

SACHER.

195. ONODI. *Mucocele of the ethmoidal labyrinth.*

Report of a case of mucocele which had penetrated into the frontal bone and displaced the frontal sinus, as shown by probing and the X-ray picture. The mucocele was opened by endonasal methods and its contents and its wall examined microscopically. Recovery.

VON EICKEN.

196. KLEIN. *The methods of operating for inflammation of the frontal sinus, with report of thirteen cases operated on according to Killian.*

A historic collection of operations for the frontal sinus. The advantages of Killian's operation are not always evident from the case histories. It is of the greatest importance to arrest the suppuration; this is even more important than a favorable cosmetic result. The latter can frequently only be determined a long time after the operation. Shortly after the operation there is but very little deformity after any method of operating.

BRUEHL.

197. THOMPSON. *Two cases of fatal frontal sinusitis.*

Two cases of double pansinusitis of ancient days where the frontal sinus had been operated upon a number of times without attacking the ethmoidal cells, from which evidently the fatal meningitis developed. Nowadays more radical methods of operating would have given better results.

BOENNINGHAUS.

198. BENTZEN. *A case of rhinogenic pyæmia.*

Report of a case presented to the thirty-eighth meeting of the Danish Oto-Laryngological Society.

JOERGEN MOELLER.

199. STOECKEL. *Broad endonasal opening of the sphenoidal cavity with the burr.*

The author recommends a club-shaped burr to open the sphenoidal cavity whose movements can be instantly arrested.

VON EICKEN.

f.—OTHER DISEASES OF THE NOSE.

200. IGNATOWITSCH. *On the treatment of rhinophyma. Ein Fall von Rhinophym-Chirurgija*, Dec., 1905.

201. SILBERSTEIN. *Venous thrombosis after paraffin operations on a saddle nose. Berl. klin. Wochenschr.*, 1906, No. 19, p. 606.

202. BAUROWICZ. *A cyst of the lower turbinal. Arch. f. Laryngol.*, vol. xviii., book 2.

203. HOLLÄNDER. *On the treatment of tuberculosis of the mucous membrane. Berl. klin. Wochenschr.*, 1906, No. 23.

204. PASCH. *On nasal tuberculosis. Arch. f. Laryngol.*, vol. xvii., book 3.

205. MYGIND. *Lupus of the Nose. Arch. f. Laryngol.*, vol. xvii., book 3.

206. SENATOR. *On lupus of the upper respiratory passages. Berl. klin. Wochenschr.*, 1906, No. 23.

207. MEYER. *The nasal treatment of epiphora. Berl. klin. Wochenschr.*, 1906, No. 23.

208. BELLIN and LEROUX. *A case of double-sided membranous atresia of the choanae. Ann. des mal. de l'oreille, etc.*, Aug., 1905.

209. GELLÉ. *Enlargement of the glands in affections of the nose and of the naso-pharynx. Ann. des mal. de l'oreille, etc.*, July, 1905.

200. IGNATOWITSCH. *On the treatment of rhinophyma.*

In this case of rhinophyma the tumor was removed in slices with a sharp scalpel. This was done at two sittings, at each of which the patient lost a great deal of blood. The cosmetic result was excellent.

SACHER.

201. SILBERSTEIN. *Venous thrombosis after paraffin operations on a saddle nose.*

Directly after the injection of 4½ccm of hard paraffin the left eye became blind, presumably from thrombosis of the ophthalmic vein. The author concludes that from the experience of this case he warns against further paraffin in-

jections. If such accidents occur, we must do away with paraffin operations, as they fulfil only cosmetic indications.

MUELLER.

202. BAUROWICZ. *A cyst of the lower turbinal.*

The cyst was situated in the posterior third of the lower turbinal and discharged pus into the middle meatus. Broad opening and packing were followed by recovery.

VON EICKEN.

203. HOLLÄNDER. *On the treatment of tuberculosis of the mucous membrane.*

Unusual is the author's idea of applying calomel locally and giving iodide of potash internally in order to obtain a more intense local iodine action. The results require to be tested on a larger material.

MUELLER.

204. PASCH. *On nasal tuberculosis.*

Nineteen cases are reported from Brieger's Clinic.

VON EICKEN.

205. MYGIND. *Lupus of the nose.*

This is a report of two hundred patients who were treated in Finsen's Institute on account of lupus of the external skin and were examined by the author for complications on the part of the nose, pharynx, and larynx. One hundred and twenty-nine of these patients presented lupoid changes of the interior of the nose, and more frequently in the female than in the male. In the pharynx and larynx the lupus occurred more frequently in the young than in the adult individuals.

VON EICKEN.

206. SENATOR. *On lupus of the upper respiratory passages.*

The basis of this communication is furnished by thirty-five cases of lupus of the face and mucous membrane observed in Lassar's Clinic.

MUELLER.

207. MEYER. *The nasal treatment of epiphora.*

In cases in which the lachrymation is the result of an abnormal narrowness of the lower meatus, the author has practised breaking the attachments of the lower turbinal rather than a resection. The turbinal is grasped by a flat nasal forceps

and turned to an angle of 30-45 per cent. Results appear in one to two weeks. MUELLER.

208. BELLIN and LEROUX. *A case of double-sided membranous atresia of the choanæ.*

In order to prevent the reclosure of the choanal opening after removal of the septum, the author has devised the original and successful plan of resecting the posterior part of the nasal septum. BOENNINGHAUS.

209. GELLÉ *Enlargement of the glands in affections of the nose and of the naso-pharynx.*

This paper draws attention to the important connection between the glandular swellings of the neck and infections of the nose and naso-pharynx. BOENNINGHAUS.

g.—NASO-PHARYNX.

210. SCHIEBER. *On the selection of children for the summer homes.* *Das rote Kreuz*, 1906 No. 8.

211. FRANK. *Hypertrophy of the pharyngeal tonsils in the old.* *Archiv f. Laryngol.* vol. xviii., book 2.

210. SCHIEBER. *On the selection of children for the summer homes.*

Before sending the children off, the adenoid vegetations should be removed. BRUEHL.

211. FRANK. *Hypertrophy of the pharyngeal tonsils in the old.*

The pharyngeal tonsil in the old differs microscopically from that found in the young. There are only a few follicles, while the adenoid tissue and the connective tissue are very much increased. VON EICKEN.

PALATE, PHARYNX, AND MOUTH.

212. MAUGERI. *Papilloma of the uvula and of the soft palate.* *Arch. internat. d'otol.*, etc., vol. xxi., p. 831.

213. BAUROWICZ. *On the diagnosis of pseudo-leucemia.* *Arch. f. Laryngol.*, vol. xii., book 3.

214. PROEBSTING. *A tonsillar clamp.* *Arch. f. Laryngol.*, vol. xviii., book 1.

215. LEVINGER. *Malignant tumors of the tonsil.* *Arch. f. Laryngol.*, vol. xviii., book 1.

216. GAREL and BONNAMOUR. *Intermittent swellings of the salivary glands as signs of salivary stones.* *Ann. des mal. de l'oreille etc.*, Nov., 1905.

212. MAUGERI. *Papilloma of the uvula and of the soft palate.*

The clinical appearance is given of three papillomata, of which two were situated in the palatal arch and one at the tip of the uvula. The microscopic examination is added.

OPPIKOEFER.

213. BAUROWICZ. *On the diagnosis of pseudo-leucemia.*

In a man forty-six years of age who had formerly had a tumor of the left tonsil which was regarded as a gumma; later the pharyngeal tonsil became enlarged, then the right palatal tonsil, numerous lymphatic glands, and the spleen. Examination of the blood revealed a condition characteristic of pseudo-leucemia. Death ensued after several months.

VON EICKEN.

214. PROEBSTING. *A tonsillar clamp.*

This instrument can be applied to any position of the tonsils in bleeding after tonsillotomies.

VON EICKEN.

215. LEVINGER. *Malignant tumors of the tonsil.*

A tumor of the right tonsil was removed in a man thirty-two years of age who had had the inguinal glands on the left side removed several weeks previously. The microscopic examination of both specimens gave endothelioma. Then a relapse occurred in the left groin, the mesenteric glands enlarged, producing an intestinal stenosis. Metastatic tumors appeared in the left ilium, the right groin, the right axilla, and the right side of the neck. The right tonsil remained free from relapses. As an autopsy was not performed, it was impossible to decide where the primary site of the tumor had been.

VON EICKEN.

216. GAREL and BONNAMOUR. *Intermittent swellings of the salivary glands as signs of salivary stones.*

Observations of nine cases in which on eating the salivary gland regularly became enlarged, which diminished on pressure with the escape of saliva or spontaneously after a

short time. In six cases the submental, in two the sublingual, and in one case the parotid glands were involved. The retention of saliva seemed to be produced by a salivary calculus whose presence was not always easily determined. This interesting condition is new, and has been given the name of "Intermittent Hernia" of the salivary glands.

BOENNINGHAUS.



ARCHIVES OF OTOLOGY.

THE ORIGIN OF THE CELLS FOUND IN THE DEEPER LAYER OF THE STRIA VASCULARIS.

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(With five illustrations on Plates A and B.)

INTRODUCTION.

THE stria vascularis occupies the outer wall of the ductus cochlearis between the attachment of the membrane of Reissner above and the prominentia spiralis below. A very rich vascular supply indicates an important physiological function for this structure. The stria vascularis has a surface layer made up of a single row of epithelial cells and a deeper layer in which cells are found scattered irregularly among the blood-vessels.

A difference of opinion exists among anatomists regarding the cells found in this deeper layer. One view is that they are epithelial cells derived from the surface layer of epithelium. The other view is that these cells are of mesoblastic origin derived from the connective tissue which separates the stria from the capsule of the cochlea.

HISTORICAL.

Retzius¹ is a prominent exponent of the view that the cells throughout the stria vascularis are epithelial in

¹ "Ueber ein Blutgefäß-führendes Epithel im membranösen Gehör-organ," *Biol. Untersuch.*, ii., 1882.

character. He held that the stria represents a genuine vascular epithelium. This view was shared by Corti, Kölliker, and Waldeyer.

Prenant¹ is the latest advocate of the epithelial character of these cells. He gives the following reasons for accepting their epithelial origin:

"En faveur de la nature épithéliale de la zone réticulée de la strie, nous ferons valoir: le lieu où elle se développe, comparé à celui qu'occupait précédemment le plasmodium épithélial; sa continuité parfaite avec la couche cellulaire propre de la strie vasculaire, et vraisemblablement son épaississement aux dépens de cette couche; ses rapports avec l'épithélium de la prominence spirale et celui de la membrane de Reissner, avec lesquels elle se continue directement au même titre que la couche cellulaire superficielle." (P. 61)

Boettcher² held the view that the blood-vessels of the stria are completely embedded in protoplasmic process from the surface layer of epithelium, whereas the cells found in the deeper layer of the stria vascularis are of connective-tissue origin.

"Während dieses geschieht, geht in den Epithelien eine auffallende Verwandung vor sich. Sie wenden lange Fortsätze in das unter ihnen liegende Schleimgewebe hinein, welche die nun ganz oberflächlich liegenden Blutgefäße umfassen und sich in dem Maschenwerk hinter denselben verlieren. So entsteht die Stria vascularis. Das Schleimgewebe verfällt allmählig einer völligen Resorption; ist diese beendet, dann liegt der Gefäßstreifen dem faserigen mehr nach aussen gelegenen Theil des Ligamentum spirale auf." (P. 145)

Schwalbe³ recognized in the cells lying in the deeper layer of the stria vascularis characteristics belonging to epithelium, but, on account of the difficulty in demonstrating the epithelial origin of these cells, was inclined

¹ "Recherches sur la paroi externe du limaçon des mammifères et spécialement sur la strie vasculaire," *Internationale Monatsschrift für Anatomie und Physiologie*, Bd. ix., 1892.

² Ueber Entwicklung und Bau des Gehörlabyrinths, Dresden, 1869.

³ Anatomie der Sinnesorgane, 1887.

to accept the view that they were derived from connective tissue.

“Von Zellen lassen sich mindestens zwei Schichten unterscheiden, von denen die oberflächlichen eine nach dem Lumen des Schneckenkanals zu scharf abgegrenzte geschlossene Schicht echter Epithelzellen von polygonalen Umrissen formirt. An Dickenschnitten erkennt man, dass ihre dem Schneckenkanal zugekehrte Fläche durch eine scharfe an einen Cuticularsaum erinnernden feinen Streifen begrenzt wird, während an der entgegengesetzten Fläche zackige Vorsprünge und nischenartige Einsenkungen der Epithelzellen auf ihre innige Accommodation an die erwähnten Blutgefäß-Capillarnetze zurückzuführen sind. Diese Schicht ist wohl zweifellos aus dem einfachen Epithel der Embryonen abzuleiten. Unter ihr liegen aber in einer oder in mehreren Lagen zwischen den Capillaren noch andere Zellen, welche mehr oder weniger dicht an einander gefügt die Zwischenräume zwischen den Capillaren erfüllen. Sie gleichen an Macerationspräparaten ebenfalls epithelialen Zellen, sind polyedrisch, bei Isolation mit feinen Spitzen und Stacheln besetzt, die wahrscheinlich Interellularbrücken darstellen. Auch diese epithelioiden Zellen werden von Retzius und Anderen als echte Epithelzellen betrachtet und dann hat in der That die Auffassung, die Stria vascularis sei gefäßhaltiges Epithel, ihre volle Berechtigung. Es bleibt dabei aber die Schwierigkeit der Ableitung dieser tieferen ‘epithelialen’ Zellen von dem einfachen Epithel des embryonalen Schneckenkanals. Mir wurde deshalb mit Gottstein die Auffassung derselben also eigenthümlich modificirte Bindegewebszellen als die natürlichere erscheinen, wenn nicht die scharfe Abgrenzung dieser Schicht gegen das unterliegende Bindegewebe und der continuirliche Uebergang des gefäßhaltigen Epithelstreifens in das benachbarte gewöhnliche Epithel sehr zu Gunsten der Retzius’schen Auffassung sprächen.” (P. 352-3)

Gottstein¹ studied the developement of the stria vascularis and came to the conclusion that a single layer of cubical epithelium covers the surface of the stria and that the cells found in the deeper layer are peculiarly modified connective-tissue cells.

¹ *Archiv für mikroskopische Anatomie*, Bd. vii., 1872.

“Der Raum zwischen der crista ligamenti spiralis und dem angulus vestibularis wird ausgefüllt von der Stria vascularis. Dieselbe wird dadurch gebildet, dass unter dem Epithel dieser Stelle das Bindegewebe eine Strecke weit fast ganz schwindet und statt dessen zahlreiche Capillaren auftreten, die bis an das Epithel herangehen, ein Vorgang, den wir zwar bereits im sulcus ligamenti spiralis gesehen haben, der aber hier nur vereinzelt, in der Stria vascularis in der ausgebildetsten Weise zur Erscheinung kommt. Das Epithel ist unverändert, cubisch und geht am angulus vestibularis in das Epithel der membrana vestibularis über. Die Gefässe der Stria vascularis hängen zusammen mit den Gefässen des stratum semilunare.” (P. 170)

Baginski¹ also studied the development of the stria vascularis and was a strong advocate of the connective-tissue origin of the deeper cells. He begins with the stage in the embryo when a single layer of cells is found along the outer wall of the ductus cochlearis and describes the development of the stria vascularis as follows:

“Die Zellen, welche vorher deutlich von einander abgegrenzt (Fig. 1 c) einen schönen grossen Kern mit Kernkörperchen und reichlichem Protoplasma zeigten, lassen bald nur mit Mühe ihre Umrandung deutlich erkennen; die Zellen werden kleiner und die Zellgrenzen undeutlich; das Protoplasma wird körniger und die Zellen nehmen im Allgemeinen eine mit Safranin viel intensivere Tinction an. Zugleich fängt auch die bisher soharfe Abgrenzung gegen das sie von aussen deckende Bindegewebe sich zu verwischen an. Die bisher scharfe Umrandung bekommt einen unbestimmten welligen Charakter; die Grenze wenn auch etwas undeutlich, lässt sich indess immerhin noch erkennen. Die in Frage stehende Bindegewebslage, welche dem Ductus cochlearis innig anliegt, zeigt in so fern eine Umwandlung, als eine Auflockerung derselben jetzt nachweisbar ist (Fig. 11 a, Taf. vi.). Es rücken die Bindegewebskörperchen mehr aus einander und die Zwischensubstanz erscheint reichlicher und die ganze Lage erheblich verbreitert; hier und da zeigen sich noch Karyokinesen und zahlreiche Blutge-

¹Archiv für mikroskopische Anatomie, Bd. xxviii., 1886.

fässe, welch bis dicht an das Epithel heranreichen. Durch den eben beschriebenen Vorgang wird die Bildung der *Stria vascularis* eingeleitet und man kann mit Sicherheit bis jetzt nachweisen, dass die Gefässe nicht dem Epithel, sondern dem Bindegewebe angehören, ebenso, dass sie bis an die Epithelgrenzen heranreichen, aber nicht im Epithel liegen."

Baginski describes the condition found in the adult stria as follows:

"Die Gefässe liegen jetzt den so veränderten Epithelien dicht an und betrachtet man die jetzige Form der *Stria vascularis*, so würde man ohne Kenntniss des Entwicklungsganges in der That zu der Meinung verleitet, das es sich um ein gefässhaltiges Epithel handelt, während doch entwicklungsgeschichtlich mit Sicherheit die bindegewebige Abkunft derselben sich ergibt." (P. 22, 23)

Katz¹ has studied the *stria vascularis* and found a single layer of large cylindrical epithelial cells on the surface which cover over the blood-vessels while the few cellular elements beneath the epithelium he believed to be of connective origin.

"Die unter dem Epithelien liegenden Zellen halte ich nicht für epitheloide oder wirkliche Epithelzellen, wie sie von einzelnen Autoren angesehen werden, sondern für Bindegewebszellen, resp. auch Lymphzellen. Wenn auch die Gefässe direct von den Epithelien bedeckt sind und zwischen ihnen verlaufen, so kann man doch von der *Stria vascularis* als Ganzes betrachtet, nicht behaupten, dass sie ein reines gefässführendes Epithel darstelle, denn der untere Theil der *Stria* enthält sicherlich noch etwas eticuläres Bindegewebe, was beim älteren Embryo und auch beim Neugeborenen in einem breiteren Lymphnetzstreifen bekanntlich vorhanden ist." (P. 70)

Leimgruber² studied the development of the *stria vascularis* in the embryo of the guinea-pig and found but a single surface layer of epithelium. He failed to find the processes from this epithelium which embrace the blood-

¹ *Archiv für Ohrenheilkunde Bd., xxxi, 1891.*

² *Zeitschrift für Ohrenheilkunde Bd., xlii, 1902.*

vessels as described by Boettcher, Gottstein, Baginski, Katz, and Prenant. The blood-vessels lay in contact with the surface layer of the epithelium. The cells lying beneath this layer and among the blood-vessels he believed were of connective tissue origin.

"Von der ersten Anlage des Canalis cochlearis an bis hinauf zum vollentwickelten Organe besitzt die Aussenwand ein einschichtiges Epithel, das an seiner Basis allerdings mit Blutgefässen in Contact treten kann, niemals aber solche in sich aufnimmt. Auch dieses Verhältnisse in der Stria vascularis bilden also eine Bestätigung der alten Ansicht, dass das Epithel stets und überall gefässlos sei. Die Stria vascularis ist keine rein epitheliale Bildung, sondern man hat an ihr zwei Gewebarten scharf zu trennen, nämlich eine oberflächliche einfache Epithellage, und zwei tiefere, durch Bindegewebe formirte Scuichten." (P. 61).

From this survey of the literature on the subject the following facts were deduced: First, the free surface of the stria vascularis is covered by a single layer of epithelium with protoplasmic processes which penetrate the deeper strata and envelop, in part at least, the blood-vessels. Second, beneath this surface layer of epithelium and lying among the blood-vessels are other cells which in the adult possess much the character of epithelium, but when studied in the embryo possess characters which suggest a mesoblastic origin.

AUTHOR'S INVESTIGATION.

I began my work on the stria vascularis by making a study of the development of this structure in the embryo of the pig. I made use of embryos of the following lengths, $3\frac{1}{2}$ cm, 6cm, 8cm, 12cm, 15cm, 18cm, 25cm. In this work the following three stages in the development of this structure were clearly shown. First, where a single layer of epithelium with a distinct basement membrane is found covering the outer wall of the ductus cochlearis. Second, where a loosely arranged

reticular net-work of cells has formed beneath a surface layer of somewhat flattened cuboidal epithelial cells. All evidence of the basement membrane which was conspicuous in the first stage has disappeared. Third, where the stria appears more compact and narrower than in the second stage. It is evident that the cells found in the deeper layer of the stria in this third stage represent the cells forming the reticulum of the second stage.

Nowhere in this study was I able to find any positive evidence bearing on the problem of the origin of the cells found in the deeper layer of the stria. No facts were found that could be accepted as proof of the view that the cells forming the reticulum of the second stage are of connective tissue origin. I therefore undertook to work out a demonstration of the origin of these cells based on a study of the basement membrane which in the first stage we found separating the single row of epithelium covering the outer wall of the ductus cochlearis from the underlying connective tissue. This membrane we had observed had disappeared when the development of the reticular layer of the second stage was completed. It occurred to me that a careful study of this basement membrane might show that it was still present when the formation of the reticulum of the second stage had already begun. In this case the relation of the membrane to these cells would afford a positive proof of the origin of the cells forming this reticulum and hence of the cells found in the deeper layer of the adult stria vascularis.

METHODS AND MATERIAL.

To work out the demonstration suggested above required the solution of two problems; first, the selection of a stain which would clearly differentiate the basement membrane from the surrounding tissue, and second, the selection of such embryonic material as would show the steps in the development of the stria during the transition

from the first to the second stage, that is, the earliest steps in the formation of the reticular layer.

The selection of a suitable stain was a most important problem, for while both the eosin-hæmatoxylin and the Van Giesen stains would show the well developed basement membrane found in the first stage, neither of these stains were found capable of differentiating the attenuated basement membrane which was present when the development of the reticular layer began. The stain that was found particularly suitable for the demonstration desired was the reticulum stain of Mallory.¹ This stain when carefully applied was found capable of selecting out the finest thread of basement membrane which it stained a bright blue in the midst of cellular elements taking largely a reddish stain.

I had already ascertained that the largest embryo of the pig that still showed clearly the condition found in the first stage, a single row of epithelium with a basement membrane, was the embryo measuring 8cm. The embryo measuring 12cm showed in the basal coil a well developed reticular layer and an absence of the basement membrane. It was clear, therefore, that to find in the basal coil the first steps in the formation of the reticular layer search must be made in embryos measuring somewhere between 8cm and 12cm in length.

The material was secured fresh and placed for 24 hours in Zenker's solution. The embedding was done either in paraffin or celloidin. When the latter was used eight different strengths of solution were employed which made it possible to cut sections 5 micra thick.

Considerable difficulty was encountered in finding preparations that would show the first step in the formation of the reticulum of the second stage. The reasons were, that the development of the reticular layer of the stria vascularis is a process which proceeds with great rapidity when once it has begun, and in the second place

¹ Mallory and Wright—*Pathological Technique*.

the measurement of the length of the embryo, however carefully done, was not found to be an accurate enough gauge to determine beforehand the exact stage in the development of the stria. Evidence was soon found, however, to show that the development of the reticulum was often well advanced before the basement membrane had completely disappeared, and with patience was finally able to get preparations that demonstrated the truth of this fact even more clearly than I had hoped when the work was begun.

Before taking up the description of the steps in the development of the reticular layer the following facts of the development of the stria vascularis should be mentioned. The stria like the other parts of the membranous cochlea develops first in the beginning of the basal coil, the development progressing toward the apex of the cochlea. In the formation of the reticulum of the stria at any point in the cochlea that part develops first which lies nearest the attachment of the membrane of Reissner, while the part nearest the *prominentia spiralis* is the last to develop. It was frequently found that the development of the reticulum of the stria would be so far advanced near the attachment of the membrane of Reissner that all evidence of the basement membrane had already disappeared when the part of the stria lying nearest the *prominentia spiralis* still presented a structure made up of a single row of cells with a strong basement membrane.

The description of the following stages in the development of the stria vascularis will suffice to illustrate the changes that lead to the formation of the reticular layer and to demonstrate the origin of the cells found in the deeper layer of this structure. The descriptions and drawings are all made from the stria vascularis of the basal coil.

8 CM. EMBRYO. FIG. 1.

At this age a single row of tall epithelial cells along the

outer wall of the ductus cochlearis marks the site where the stria vascularis is forming. The scala vestibuli has not yet formed, but the upper limit of the stria is clearly shown by an abrupt transition in the character of the epithelium from tall cells of the developing stria to low cuboidal cells of the future membrane of Reissner. At the lower limit of the stria the boundary is also clearly shown by a distinct notch covered by epithelium somewhat lower in character which marks the site where the prominentia spiralis is later formed. A strong, well-developed basement membrane separates the layer of epithelial cells along the outer wall of the ductus cochlearis from the underlying connective tissue. This connective-tissue layer which later enters into the formation of the ligamentum spirale is supplied with blood-vessels, which, however, do not approach the basement membrane separating this connective-tissue layer from the surface of epithelium.

10½ CM. EMBRYO. FIGS. 2 AND 3.

The stria vascularis in the basal coil of an embryo pig at this age is in the stage of transition from the first stage as described above to the second stage where the reticular layer is fully developed. The scala vestibuli in the basal coil has already partly formed, and the membrane of Reissner forms a right angle with the outer wall of the ductus cochlearis. The notch which in the 8cm embryo marked the site of the prominentia spiralis has disappeared and this point is recognized by a lower type of epithelium than the tall cylindrical cells of Claudius which clothe the adjoining sulcus externus.

The stria vascularis itself, particularly in the part nearest the attachment of the membrane of Reissner, shows a marked change from that found in the first stage. A single row of more or less flattened epithelial cells forms the surface layer, the protoplasm of which stains

rather deeply, and here and there forms processes which extend into and in places through a deeper layer. This deeper layer is made up of irregularly scattered cells and constitutes the first evidence of the reticular layer of the stria. *A clearly defined basement membrane separates this reticular layer from the underlying connective tissue.* The membrane is directly continuous with a basement membrane separating the epithelial layer of the membrane of Reissner from a loose reticulum of connective tissue still present in the floor of the scala vestibuli. The basement membrane of the stria vascularis is directly continuous below with the basement membrane separating the cells of Claudius in the sulcus externus from the connective tissue of the ligamentum spirale.

An examination of the stria vascularis near the beginning of the basal coil shows a still further development in this structure. (See Fig. 3.) In the first place the basement membrane, which was conspicuously present in the stage described above as shown in Fig. 2, is intact only in the lower half of the stria, whereas in the upper half it has already largely disappeared. Scattered fragments recognized by their blue stain still clearly mark the site of this membrane. In the second place a marked change in the underlying connective tissue has taken place. About midway between the basement membrane and the endochondrial layer a zone of condensation of the connective-tissue cells has formed. On either side of this zone a looser arrangement of the cells is found. On the side towards the endochondrium a loosely constructed fibrillar network of cells exists. On the side towards the stria the network assumes quite a different character. Here the meshes instead of the fibrillar structure have a lamellar character resembling more and more, as the basement membrane is approached, the type of reticulum formed by the cells lying between the basement membrane and the surface layer of epithelium. This resemblance is also evident in its staining properties. Instead

of the bluish stain taken by the fibrillar net-work of the compact zone and the cells lying between this and the endochondrium, this reticulum takes a reddish stain like the reticulum lying between the basement membrane and the surface epithelium. At the several points where the basement membrane is wanting an intimate connection between the reticulum on either side of this membrane exists. So close is this connection that but for the blue stain taken by the fragments of basement membrane it would be impossible to tell where the reticulum formed from the cells derived from the epithelium leaves off and where that formed from the connective tissue begins. In the surface layer of epithelium the protoplasmic processes extending into the deeper layer are more marked. Small blood-vessels containing but a single row of blood cells are occasionally found lying between the basement membrane and the surface layer of epithelium.

15 CM. EMBRYO. FIG. 4.

In the pig embryo of this age the second stage in the development of the stria is found, that is, where the formation of the reticular layer has been completed. The characteristic blood-vessels of the stria vascularis have formed, and these vessels are found lying in contact with the surface layer of epithelium. The compact zone in the underlying connective tissue described in the preceding stage is more clearly marked as is the fibrillar character of the loose network of cells lying between this zone and the endochondrial layer. The reticular layer of the stria vascularis is found to include all the cells lying between this compact zone and the surface layer of epithelium. All vestige of the basement membrane has disappeared, and it is only by comparing this stage with the previous one as shown in Fig. 3, that a correct understanding of the origin of the cells forming the reticulum of the stria is reached. From this comparison

It is perfectly clear that the *reticulum of the stria vascularis* is made up of cells derived in part from the surface layer of epithelium and in part from cells derived from the underlying connective tissue. The line of division between the epithelial elements and the connective tissue elements of the stria is therefore not directly beneath the surface layer of epithelium as claimed by Gottstein, Baginski, and others, nor yet where the reticulum joins the underlying connective tissue as advocated by Retzius, Prenant, and others, but this line of division falls somewhere in the midst of the reticulum of the stria vascularis itself, that is along the line previously occupied by the basement membrane as shown in Fig. 3. The surface layer of epithelium in this stage sends out deeply staining protoplasmic processes which for the most part envelop the blood-vessels.

25 CM. EMBRYO. FIG. 5.

The stria vascularis in this stage has assumed in a large measure the character which it retains permanently. A more or less narrowing of the band is about the only noticeable change that takes place later. In this stage the protoplasmic processes from the surface layer of epithelium, possessing a distinct fibrillar character, have penetrated the entire depth of the stria. These processes taking the stain deeply give to the whole stria vascularis a dense appearance which in the previous stages was noted only along the free surface of this structure. The reticular character of the deeper layer so well shown in the 15cm embryo has been completely obliterated. This has been brought about in part by the invasion of the deeper structures from the protoplasmic processes of the surface epithelium and in part apparently from a partial absorption of the reticulum associated with a contraction which renders the width of the stria considerably narrower than in the previous reticular stage.

That the cells forming the reticulum have not been completely absorbed in this transformation is evident from the cells still found scattered among the blood-vessels and the protoplasmic processes from the surface layer of the epithelium. These are the cells about the origin of which there has been so much discussion in the literature, some observers holding that they are derived from the surface layer of epithelium, others that they are connective tissue cells. Since it has been definitely shown in Figs. 3 and 4 that the cells forming the reticulum of the stria are derived in part from the surface layer of epithelium and in part from the underlying connective tissue it is fair to assume that these cells found in the deeper layer of the adult stria vascularis are a mixture of epithelial and connective tissue cells.

As regards the question whether the blood-vessels are completely embedded in epithelium, that is whether we have here in the stria vascularis a vascular epithelium, my observations lead me to agree with those who believe that we have in the stria vascularis a genuine vascular epithelium for it is quite clearly shown in Figs. 3 and 4 that the cells surrounding the blood-vessels are derived from the surface layer of epithelium.

RESUMÉ

1. Two views exist regarding the origin of the cells found in the deeper layer of the stria vascularis. One is that these cells are derived from the surface layer of epithelium, the other is that they are of connective tissue origin.

2. In the development of the stria vascularis three distinct stages are found, *first*, where a single row of epithelium is found along the outer wall of the ductus cochlearis having a distinct basement membrane which separates it from the underlying connective tissue, *second*, where a broad reticular layer has formed beneath

the surface layer of epithelium. In this stage the basement membrane has completely disappeared and the blood-vessels of the reticulum have formed. *Third stage*, the condition found in the adult stria vascularis. Here the stria represents a narrower band than is found in the second stage, protoplasmic processes from the surface layer of epithelium have penetrated the entire stria, the reticulum has been completely obliterated.

3. A study of the transition from the first to the second stage brings out the fact that the basement membrane separating the epithelium from the connective tissue persists until the formation of the reticulum of the second stage is well advanced. The position occupied by this basement membrane is not directly beneath the surface layer of epithelium as it would be in case the reticulum was derived from the underlying connective tissue. The basement membrane is found passing through the midst of the cells forming the reticular layer and at a considerable distance from the surface layer of epithelium. This position of the membrane proves definitely that the cells forming the reticulum are derived in part from the surface layer of epithelium and in part from the underlying connective tissue.

4. The blood-vessels of the stria are placed directly beneath the surface layer of epithelium and as soon as formed are enveloped in protoplasmic processes from the surface layer. In addition the cells immediately around the blood-vessels are clearly derived from the surface layer of epithelium, so that while the cells found in the deeper layer of the stria are in part epithelial and in part connective tissue we are justified in assuming that the stria vascularis represents a true vascular epithelium.

EXPLANATION OF PLATES.

Terms Common to all the figures.

- (a) Epithelium of stria vascularis.
- (b) Connective-tissue layer.

- (c) Endochondrial layer.
- (d) Cartilaginous capsule of cochlea.
- (e) Membrane of Reissner.
- (f) Prominentia spiralis.
- (g) Sulcus spiralis externus.
- (sv) Stria vascularis.

Material fixed in Zenker's solution and embedded in celloidin. Sections for figures 1, 2, 3, 4, cut 5 micra thick and stained with the Mallory reticulum stain. Section for Fig. 5 is cut 10 micra thick, and stained by the Van Gieson method.

FIG. 1.

Sections through outer wall of ductus cochlearis in basal coil of 8cm embryo pig, showing a single row of epithelium with basement membrane. Leitz Obj. 1/7 Oc. 2.

FIG. 2.

Section through outer wall of ductus cochlearis in basal coil of 10½ cm embryo pig, showing basement membrane still intact, but separated from the surface epithelium by reticular cells. Leitz Obj. 1/7. Oc. 2.

FIG. 3.

Sections same as Fig. 2, but taken from near beginning of basal coil, showing basement membrane partly absorbed. The outline of the reticular layer shown to include a layer of cells on each side of basement membrane, thus demonstrating that the reticular is made up in part from epithelium and in part from connective tissue. Leitz Obj. 1/12 Immers. Oc. 2.

FIG. 4.

Section through outer wall of ductus cochlearis in basal coil of 15cm embryo pig, showing fully developed reticular layer and complete disappearance of basement membrane. Leitz Obj. 1/12 Immers. Oc. 2.

FIG. 5.

Section through outer wall of ductus cochlearis in basal coil of 25cm embryo pig, showing prominentia spiralis and adjacent part of stria vascularis. Leitz Obj. 1/12 Immers. Oc. 2.

Fig. 1.

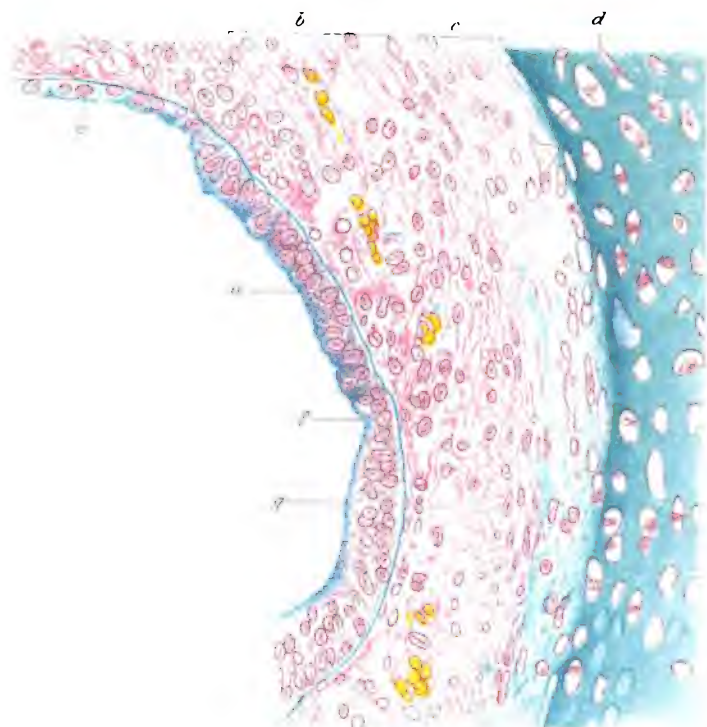


Fig. 3

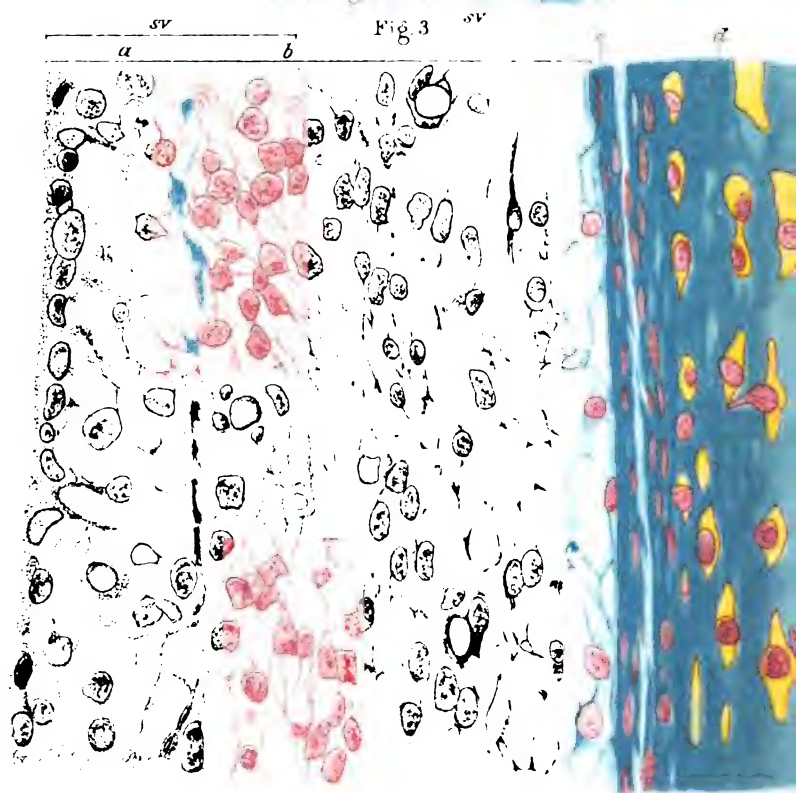
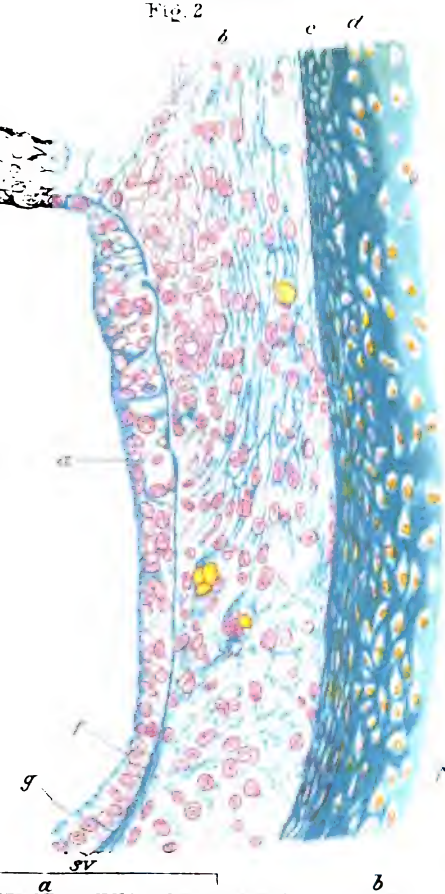


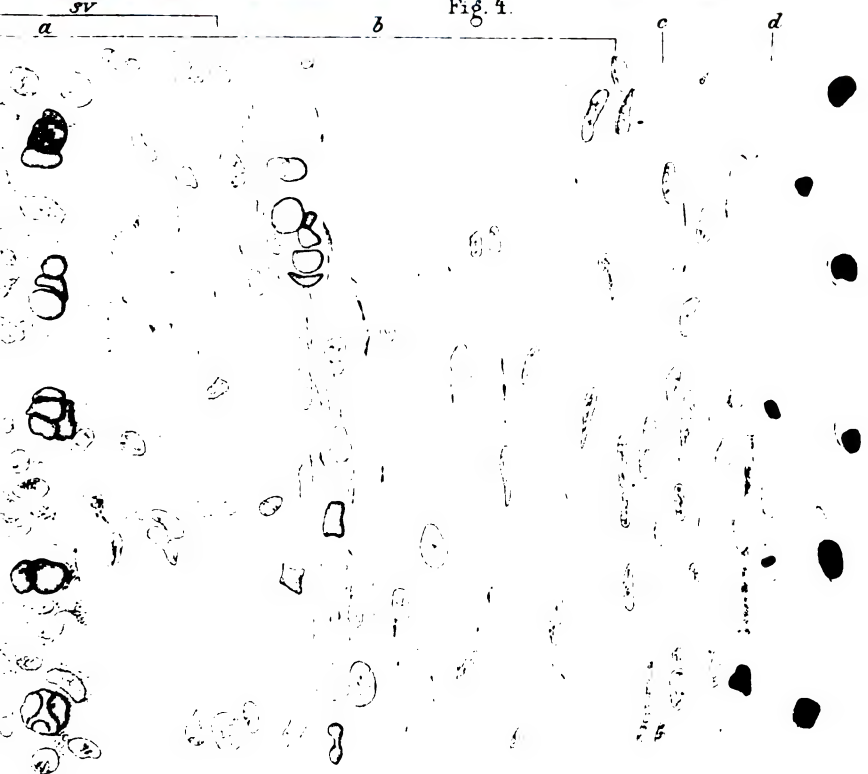
Fig. 2



Tab. 1.



Fig. 1.



THE VALUE OF V. STEIN'S SYMPTOM IN THE DIAGNOSIS OF LABYRINTHINE SUPPURATION.¹

BY DR. W. P. EAGLETON, NEWARK.

(With one illustration in the text.)

THAT labyrinthine suppuration frequently complicates otitis media has been demonstrated in recent years. Its varying degrees of frequency, in the experience of different operators, largely depends on two conditions: First, the opinion of the operator whether or not a radical operation is advisable in all cases of chronic suppuration, without other symptoms; and, secondly, on the thoroughness with which all parts are exposed, and minute granulations and fistulæ are searched for. During the month of last October in following Jansen's operations, what was roughly judged to be about 25% of all his tympanic exenterations disclosed fistula leading into the labyrinth, every one of which he very carefully, but fully, exposed, often at the risk of damage to the facial nerve, but frequently without injuring it.

At the Newark Eye and Ear Infirmary in the services of Drs. Kipp, Seidman, Sherman, and myself, out of 17 consecutive cases of tympanic exenteration, for chronic suppuration, 7, or 41%, were found to have fistula leading into the labyrinth, while 3 more which have not as yet been operated on present symptoms warranting such a diagnosis. Of the 7 cases, 2 had disease of the

¹Read at the meeting of the Section on Otology, N. Y. Acad. Med., March 8, 1907.

cochlea and semicircular canals, the remaining 5 being of the semicircular canals alone.

Although its frequency is now generally recognized, but little progress has been made in the diagnosis of its existence, the condition being usually unsuspected until discovered at the operation. Thus in the seven cases, in five it was unsuspected prior to the operation, while in the sixth it was tentatively diagnosed, and only positively diagnosed in the seventh. This latter diagnosis was made possible by an investigation of the disturbances of the sense of orientation, or sense of position, during co-ordinate movements, to which von Stein called attention in 1904. In two, at least, of the other five cases, it would have been possible to have diagnosed the condition prior to the operation, as they still exhibited such disturbances, notwithstanding that the labyrinth had been exposed and drained, several months previously.

Von Stein's original paper, published in 1896 (ARCHIVES OF OTOTOLOGY, vol. xxv., p. 98), dealt with the "disturbances of equilibrium in ear disease not especially suppurative. First, with the eyes closed, in the absence of ataxia or alterations of sensibility; second, with the eyes open, *rapid* movements never attaining their normal correction and promptitude; third, the disturbances only being demonstrable in certain situations and direction; fourth, not being equally divided between the two lower extremities; thus, for example, a patient can stand on one leg but not on the other; fifth, the polymorphia in the disturbances; sixth, the rapid fatigue in motion, especially with closed eyes; and seventh, the smaller angle of inclination in which the patient is able to preserve the upright position on the goniometer."

It would seem that these important observations would have called for a more thorough investigation on the part of otologists, but little notice was paid to them until von Stein in 1904 (*Trans. 7th International Otological Congress at Bordeaux*, p. 297) called attention to the presence of

a peculiar inability of patients suffering from labyrinthine suppuration to execute certain delicate co-ordinative movements. Thus, with the feet placed together, especially when the eyes are closed, such patients cannot repeatedly jump with the degree of assurance of a normal person, but are compelled to catch themselves after one or two jumps, by throwing one foot out. In some cases this is so marked that they are unable so to jump even with the eyes open. This symptom was present in all of the eight cases of labyrinthine suppuration reported by him, in which subsequent operation verified the diagnosis.

He also reports the behavior of these cases when tested on the goniometer, which showed inability to maintain the erect position at a very much more diminished angle of inclination than normally. With the latter instrument I have had no personal experience, although its application must be comparatively simple.

Recently I have applied von Stein's test on all my private, and on many of the Dispensary cases, suffering from chronic otitis, besides many perfectly normal persons, so that I have observed between two and three hundred persons altogether.

From these observations I draw the following conclusions: First, a normal person not suffering from disease of the labyrinth, suppurative or otherwise, jumps with his eyes closed with a degree of assurance, not perhaps on the first attempt, but surely on the second or third. Second, in applying the test, *age* must be considered, as past middle life normal persons while jumping slowly but accurately for a few feet soon tire and so lose the accuracy of the movement, probably from exhaustion. Third, the symptom has a value in chronic non-suppurative aural disease in which the labyrinth has become affected. Fourth, the symptom is *very* valuable in labyrinthine suppurations, especially in chronic suppurations of the semicircular canals, and, in such, may be the *only* symptom of the condition. It was present in at least five of my

cases and probably in all, had it been sought for prior to the operation. Fifth, the symptom is probably more marked in the early involvement of the labyrinth.

From my cases it would appear that as suppuration goes on the patient gradually regains, to a large degree, the ability to perform the co-ordinate movements, at first lost. This was shown by the following case: A young woman with a chronic suppurative otitis with a discharge so slight that she at first denied its existence, suddenly became dizzy and fell in the street in a "fainting spell," as she called it. She continued dizzy and nauseated for several days, during which time, with a greatly increased discharge, a marked facial paralysis of the same side developed. The dizziness and vomiting soon subsided. Within ten days she was apparently well, although totally deaf in this ear, there still remaining a slight facial paralysis. On examination, however, it was found that she was unable to stand on either foot alone, even with her eyes open. She could, however, stand much longer on the foot of the unaffected side than on that of the affected one. This also within a few days greatly improved and now, eight weeks after the attack, she can stand on either foot for several seconds and there is no trace of the facial paralysis. She, however, cannot jump either with her eyes open or closed, without falling toward the affected side.

Sixth: the symptom persists in some cases after the drainage of the labyrinth, but disappears in others. Thus in five cases observed some months after operation it was still present in three, while in the other two it was absent. Both of these latter were young patients, while the other three were all in middle life. Whether, however, it was present in all prior to the operation it is not known, as they had not been previously tested.

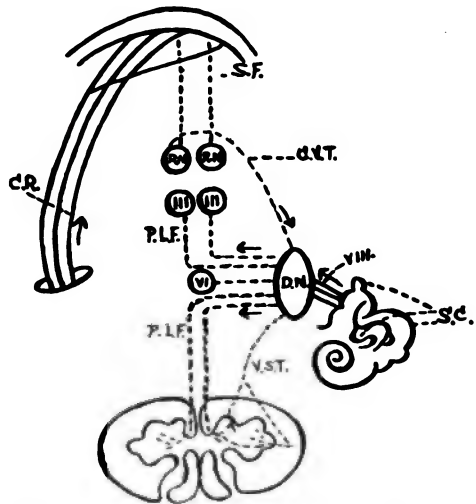
It would appear that the symptoms of suppuration of the labyrinth, where the semicircular canals at least are involved, may be divided into three stages: An active stage,

or stage of irritation, with dizziness, with great impairment of co-ordinate dynamic movements, associated perhaps with nausea, vomiting, and nystagmus; second, a paralytic or latent stage, in which all symptoms are absent excepting the ability to perform with closed eyes certain delicate co-ordinate movements, requiring both a correct orientation and accurate co-ordination; and third, even this may disappear, especially in young persons, after drainage of the labyrinth and perhaps without it.

What physiological data have we for supposing that the vestibular nerve has any influence over the muscular apparatus? "Ewald (Panse, 'Vertigo,' translated by A. Knapp, ARCH. OTOL., 1902, p. 479) assumes the presence of a constant influence on the muscular apparatus of the body through the labyrinth of the same side." "Doves in whom both labyrinths had been removed lost knowledge of the position of the head. If a cap was drawn over the eyes the head sank to the ground from its own weight. The muscular sense thus furnished no clue of the head's position. Dreyfuss (*Id.*, p. 480) also assumes the presence of a labyrinthine tone. He experimented on guinea-pigs and makes a distinction between the symptoms which follow the removal of a labyrinth on the first day and *permanent* ones, the latter consisting of a concavity of the trunk towards the affected side." "Adler (*Id.*, p. 486) assumes the existence of an apparatus of equilibrium whose centripetal arm is the vestibular nerve, whose centre is furnished by Deiter's nucleus, and whose centrifugal arm is the connection of Deiter's nucleus with the oculo-motor nuclei and the anterior horns of the cord. This usually acts below the threshold of consciousness."

Panse (p. 486) says, "we must assume, as my experiments have shown, the presence of numerous connections between the labyrinth and all muscles."

Preserving our equilibrium as we do, first by the exercise of our ocular sense, second our kinæsthetic sense, made-up



*Scheme of connection of
Vestibular nucleus
Copied from Rinne*

of muscular, cutaneous, articular, and visceral sense, and third by the sense of special orientation situated in the semi-circular canal, observations show that, with an impairment of the sense of orientation in one labyrinth, delicate infrequently used muscular movements cannot be performed with normal accuracy, especially when the ocular sense is also removed by closing the eyes.

- I. ON THE SIGNIFICANCE OF THE OPERATIVE FINDINGS FOR THE DIAGNOSIS OF PURULENT INFLAMMATION OF THE LABYRINTH DURING EXPOSURE OF THE MIDDLE-EAR CAVITIES.
- II. INDICATIONS FOR OPENING A PURULENTLY AFFECTED LABYRINTH.

BY PROFESSOR V. HINSBERG, Breslau.

Translated by DR. ARNOLD KNAPP, from *Zeitschr. f. Ohrenhkl.*, Vol. LII, Nos. 1 and 2, 1906.

I.

IN order to make a definite diagnosis of a suppuration of the labyrinth it is necessary, in addition to an exact functional examination before the operation, to carefully examine the labyrinthine wall after exposure of the middle ear.

The parts to which we must chiefly turn our attention are well known to be the two windows, the promontory and the horizontal semicircular canal, much less frequently the other semicircular canals.

As the result of this examination is just as important as the functional examination to tell us what further steps we have to take, I should like to briefly review the question as follows:

1. To what degree can we ascertain the presence or absence of these changes with certainty?

2. What deductions can we draw as to the extent of the disease within the labyrinth from the changes which appear externally?

As regards the first question, one of the sites of entrance for a suppuration is the round window. This is inaccessible to a direct examination by the eye and probe as long as the destruction is limited to the region of this window and does not extend to its bony surroundings. A perforation through the round window we would, therefore, never be able to confirm at operation, unless possibly a functional examination might permit this diagnosis.

Fistulæ in the promontorium are, however, directly visible by the eye after the middle ear cavities are fully exposed. Essential for this as well as for the recognition of any change in the labyrinth wall is very careful hemostasis and intense illumination.

Before the operation these fistulæ may sometimes be visible with the otoscope.

Careful use of the probe, which procedure can be undertaken with safety, usually tells us to what extent the destruction extends into the interior of the labyrinth and whether sequestra are situated in the depth. As sequestra are frequently discovered during the after-treatment which presumably were present at operation, it is urged that we examine this area very carefully during operation.

The conditions regarding the oval window are more difficult. From fear of injury to the stapes, we, in conjunction presumably with most colleagues, have carefully avoided this region and have left small granulations situated in the neighborhood of the window. In recent years at every radical operation, if the functional examination has suggested the presence of a labyrinthine suppuration, we have always endeavored to obtain a clear picture of its condition. Numerous cases of meningitis have shown how unfortunate it is to overlook a perforation in the oval window.

A good survey of this window area necessitates a careful diminution of the facial ridge.

Granulations if present are not removed by a curette but by means of a fine anatomical forceps. The stapes has thereby never been injured. We then frequently with our bare eyes have been able to determine whether the stapes was present or not. Then with a probe, if the presence of the stapes is not determined, we endeavor by careful use of this instrument to see whether the window is open or if a firm resistance is present. In a number of cases we have thus been able to determine with certainty a perforation through the oval window. In other cases bony resistance could be felt, so that we had to assume that the stapes plate was still *in situ*. Kuemmel has also frequently been able to recognize the absence of the stapes. In some patients—and these were the majority—it was not possible to obtain any accurate information.

In these examinations a dislocation of the stapes has never occurred, a condition which would have surely been revealed by the consequences. This subject is not, however, exhausted, and with increasing practice in observation I think the number of indefinite cases will decrease. In one case paresis of the facial nerve, which had been exposed by a cholesteatoma, resulted after the use of the probe.

In brief, I maintain that complete absence of the stapes may frequently be determined at operation.

On the other hand, it will probably not be possible to define a defect in the annular band or in the footplate if the rest of the stapes is still preserved.

A perforation in the region of the horizontal semicircular canal may be easy or difficult to recognize. It is easy when, as in the form which Jansen has so well described, the semicircular canal, in its gross appearance unchanged, presents a distinct furrow along the prominence.

Unquestionably spontaneous dehiscences may occur in this prominent part of the semicircular canal, as Brieger has correctly pointed out. Their association, however, with a purulent otitis is surely very unusual.

This variety of fistula of the semicircular canal is the most frequent. The correct interpretation of the picture is more difficult when by erosion, especially by cholesteatoma, the prominence of the semicircular canal is destroyed. Then, even for the experienced one, it is difficult to decide whether a small depression is the lumen of an exposed canal or a small cell of an accidental depression. Osteophytes may complicate the picture to a greater extent.

When the fistula is situated at an atypic situation, namely very far forward or very posteriorly, its recognition is not easy. Recently at an operation we found an oval depression very far posteriorly which appeared to be somewhat darker. As facial paralysis had been present before the operation, we could not decide whether this was an erosion of the semicircular canal or of the facial canal. Examination with the probe seemed to be impracticable. The question was solved upon surveying the oval window and finding the stapes to be absent. A probe introduced through the window entered freely into the fistula and at this moment discharge issued from the fistula. Similarly, on probing the oval window we discovered a very fine opening at the upper part of the prominent ridge which before had escaped our attention. As the surface of the semicircular ridge was otherwise intact, we assumed that a perforation had taken place from within outward.

According to Jansen and Friedrich, the presence of a dark line at the level of the semicircular ridge, meaning a translucent lumen, is generally the evidence of extensive disease of the interior of the labyrinth.

Brieger, on the other hand, thinks that a healthy

lumen of the semicircular canal may appear dark when the bony capsule is very thin.

In certain cases a decision can be reached on carefully inspecting the oval window and the promontorium. If a perforation is present the dark line is probably pathological.

In our experience the cases with disease of the semicircular canal have been easily recognized.

Very much more difficult are the conditions in the presence of fistulæ in the posterior or upper canals. These result generally from deep-seated destruction of the petrous pyramid, and it probably is very difficult to recognize the lumen of a canal in a diseased area unless the diseased focus extends into the fistula, and then the condition is cleared up on the use of a probe.

The importance of a careful examination cannot be overestimated in the determination of the extent of the suppuration within the labyrinth.

We are aided also by the many histological examinations of diseased labyrinths which have been published during the last years.

They show without exception that in the presence of a perforation through the window or in the promontory, an extensive destruction is present, and this is all the more confirmed when the functional examination before the operation reveals, in addition to deafness, distinct disturbances of equilibrium, whether they are of an irritative or of a paralytic character.

There can be no discrepancy in the opinions on this condition.

The importance of fistulæ in the semicircular canal is, however, not accepted by all.

These are unquestionably in certain cases signs of extensive labyrinth infection, especially when, as is not infrequent, there are also other labyrinthine fistulæ and the functional examination has shown distinct disturbances.

On the other hand, there are unquestionably cases of semicircular fistulæ where the infection has remained localized to the immediate neighborhood and we have circumscribed labyrinth disease before us.

This variety was first described by Jansen. Recently Friedrich in his monograph has not been able to confirm the condition. I should, therefore, like to report a number of autopsies.

The first is the well-known case of Jansen, in which the author says expressly that the membranous horizontal canal was dark red in color and swollen, and on microscopic examination the wall was found to be infiltrated with small cells, while the upper semicircular canal, the vestibule, and the cochlea were without particular changes even on microscopic examination.

The site of infection, a very small round defect in the anterior branch of the horizontal canal wall in the tympanicum, was overlooked at the operation.

Friedrich thinks that in this case, as well as in one which I reported, the operative injury was responsible for the changes. I am entirely on Jansen's side and cannot see how there is any room for the thought of a traumatism during operation in this description. On the other hand, I grant that the injury to the semicircular canal did take place at operation, that, nevertheless, does not change the fact that the inflammation remained localized to the semicircular canal.

I have published a case of isolated disease of the upper semicircular canal ("On the Formation of an Otic Ceratoid Abscess: Infection through the Hiatus Subarcuatus." *Deutsche med. Wochenschr.*, 1904, No. 39). In this case the bony wall of the upper semicircular canal was destroyed by an extradural abscess, so that its lumen was widely opened. The membranous canal was also defective. In the immediate neighborhood of this area there was a similar small infiltration. The labyrinth otherwise was free from pathological changes.

Zeroni, in vol. lxiii. of the *Archiv f. Ohrenheilk.*, has reported a case of isolated disease of the semicircular canals. Absolute proof of this supposition could not be furnished, as the preservation of the specimen was faulty. The author has personally informed me that he himself did not question the fact that the suppuration remained localized to the semicircular canal.

A certain case of isolated disease of the semicircular canal is given in the Yearly Report of the Halle Ear Clinic for 1904-05. In the autopsy report it is stated that a fistula in the horizontal semicircular canal is closed towards the membranous labyrinth. The labyrinth fluid is clear. In Case 11 it is also stated that there is a fistula in the semicircular canal—labyrinth water clear.

Moreover von Stein states that in five of his cases disease was found limited to the perilymphatic space in the region of the semicircular canal fistula.

Goerke found a fistula in the ampullary prominence which was separated by connective tissue from the rest of the labyrinth.

In addition to these autopsy reports, it has frequently been possible in the living to determine that a large part of the labyrinth was capable of its function, notwithstanding the presence of a fistula in the semicircular canal.

It is not infrequent to find a fistula in a semicircular canal and a cochlea which possesses its function.

A striking case of this is that of Mrs. W., who before operation was able to hear a whisper at 2m. As at that time I could not reconcile such good hearing with labyrinth disease, I assumed the severe disturbance of equilibrium associated with vertigo to be due to a cerebellar abscess, which we, however, did not find. Then I decided to sacrifice the well-preserved drum and exposed the labyrinth wall, to find a fistula in the semicircular canal. The labyrinth was not opened on account of the excellent hearing. The patient recovered. Destruction of the

ossicular chain reduced the hearing. Two years later the hearing was re-examined and found to be, whisper in 20cm.

Of interest in this connection is a case reported by Jørgensen and A. Knapp (ARCHIVES OF OTOLGY, vol. xxxii.) where at operation fistulæ were found in the semicircular canals on both sides; while one ear was deaf after operation, the hearing in the other was $\frac{1}{2}$, which was improved to $\frac{1}{2}$ by the use of an artificial drum.

In most of the cases of fistulæ in the semicircular canals there were distinct signs of irritation or defect in the vestibular system. These, however, may be entirely absent. This condition has only been ascertained since the time that we examine each patient before operation on the ear according to von Stein's method.

In the recent case of a young man, where the functional examination (hearing and equilibrium) did not give the slightest clue to disease of the labyrinth, a typical fistula was found at operation in the semicircular canal, which admitted a probe. After this there was a distinct disturbance of equilibrium which persisted for a few days. Some time after the operation deafness was distinctly present.

This can possibly be explained by the fact that, notwithstanding a defect in the bony canal from the cholesteatoma, extensive disease of the membranous canal had not occurred. This first followed the traumatism produced at operation.

If we take in review these facts, I do not think there can be any question that isolated disease of the semicircular canal occurs. The frequency of this condition in proportion to extensive suppurations is still undecided.

Formerly, when our knowledge of labyrinthine suppurations was limited to conditions found at operations, we thought that they were very frequent, while Friedrich believes that their existence has really not been proven, based on the autopsy reports of patients who died from

labyrinth suppurations. He regards the frequent observations of so-called labyrinthine fistulæ to be found in literature as based on mistakes in observation.

If we were to decide the frequency of isolated suppurations of the semicircular canals by the number of cases which have been histologically examined they surely would be very unusual, because, compared to the few which I have just been able to quote, there are a great number of cases of panlabyrinthitis. I do not think, however, so extensive a deduction can be drawn from this fact.

As extensive disease of the labyrinth is frequently followed by fatal complications, it is found present at autopsy by the otologist. The case of the circumscribed inflammation is, however, quite different. It never leads to death as long as the inflammation remains localized to the semicircular canal. We may expect to find it at the autopsies of those persons only who have died of a disease independent of the labyrinth—and this in fact was true of the few cases above quoted by me.

Further systematic examinations are necessary along this line, and it probably will take a number of years before this question can be decided.

II.

The successful solution of the question when the purulently affected labyrinth was to be opened at operation was prevented by a number of conditions: First it was impossible in every case to diagnosticate a labyrinth suppuration, and, secondly, it was impossible to determine its extent with any degree of probability. Furthermore we were ignorant of the danger of operating in the region of the labyrinth, as well as of the result of operations as shown by the subsequent course of the disease.

To any one conversant with recent literature the

variance of the views of various authors as regards the last point must be apparent. For instance Botey (*Annales des maladies de l'oreille*, Dec., 1903) does not believe the danger of operating to be very great; in every case, even in circumscribed disease of the semicircular canal, the labyrinth should be opened. All others consider every operation on the labyrinth to be very dangerous. Friedrich, in his monograph (p. 104), says there are a certain number of cases where meningitis followed an operation of this character (the broad opening of a semicircular canal), and Zeroni, in his article on post-operative meningitis (*Archiv f. Ohrenheilk.*, vol. lxvi., p. 234), believes that operations on the labyrinth carry with them a greater danger than those which consist in exenteration of the tympanum, and that the above cited number of cases of meningitis would be very much larger if the fatal cases following operations on the labyrinth had been added to it. As there is danger of producing an infection of the meninges by tearing protective adhesions, it is to-day generally accepted not to operate in cases where labyrinth disease has been definitely known to exist, unless threatening symptoms are present or collections of pus under pressure are recognized. I asked Dr. Zeroni to which cases he was referring in the above quotation, and he replied that he had in mind the case of Hintze published by Jansen, which I had in my first monograph described as a death due to operation, and Case 13 of Friedrich. I cannot, however, agree to accepting the latter case, because the patient was entirely well for eight days after the operation, then signs of a fatal meningitis appeared. I believe it is much more probable that in this case the operation on the labyrinth was not timely enough to prevent extension to the meninges. Zeroni added in his letter that he also had in mind the accidental openings of the labyrinth.

Klug in his article on Suppurations of the Labyrinth (*Annales des mal. de l'oreille*, vol. xxxi., No. 2, 1905)

says: "I wish only to mention the danger of a meningitis due to operation which appears most frequently after opening the labyrinth" (p. 186). He mentions, however, that among nine of his own cases no meningitis followed, so that the danger cannot surely be very great.

Objections to operations on the labyrinth are based principally on theoretical and presumably perfectly proper reasons, that by the operation the protective adhesions are torn and we induce an infection of the interior of the skull which is just what we are trying to avoid.

In order to test this particular objection, I have had collected all cases of labyrinth operations so far as they were accessible. Dr. Freytag found that his figures spoke with great probability in favor of opening of the labyrinth. It does not necessarily expose the patient to greater danger, and the prognosis is much improved.

I need hardly mention that this question has not been definitely solved by our statistics. On the other hand, these figures are so large and the differences are so striking that the rôle of accident may be excluded, and I think we are safe in following this experience so long as we have nothing better, and are even entitled to outline some indications for the operation.

The operation, to my mind, is always necessary when on exact functional examination (deafness and symptoms of irritation or defect of the vestibular apparatus) and the conditions found on exposing the middle-ear cavities show us that extensive disease of the labyrinth is present.

If the functional examination and the operation point to circumscribed disease of the semicircular canal, or if at operation a labyrinth fistula cannot be definitely proven, I think it is best at first to wait, then to operate secondarily if the symptoms of irritation which were present before the operation do not quickly disappear, or if these should appear first after the operation on the middle ear.

Moreover the suspicion that an endocranial complica-

tion is present or threatens indicates the opening of the diseased labyrinth.

These indications are somewhat more extensive than those of Jansen, because we regard the operation as indicated even in cases without symptoms of irritation but which definitely present symptoms of defect. This has especially been proven to my mind by the fact that it is in just these latent cases that a radical operation, if it does not invade the labyrinth, is frequently followed by meningitis.

Expectant treatment in circumscribed disease of the semicircular canal is recommended, because this form frequently is recovered from, and rarely leads to a fatal complication.

In my own personal experience, of all the cases of circumscribed semicircular disease observed at Breslau not one succumbed to the consequences of a labyrinthine suppuration.

The autopsy reports of cases dying from the result of a labyrinth infection seem also to confirm this view. Among these I discovered a case reported in the Hals-Nasen-Ohren-Klinik (1898-99) where a semicircular canal proved to be the only site of infection, while in the others destruction was also present in the neighborhood of the windows of the promontory wall in addition to the semicircular canal fistula. Death followed in this patient so short time after the middle-ear operation that it can hardly be assumed that a localized affection of the semicircular canal was present at operation, which in turn produced an infection of the rest of the labyrinth with secondary formation of fistulæ in the window of the promontory.

It is perfectly reasonable to say that during the operation a circumscribed suppuration has been allowed to extend, through careless use of the probe, concussion from the chisel, retention from too firm packing, etc. This seems to have been the case in our Case 47, as before.

the operation there was some hearing, which was lost afterwards.

These exacerbations, so far as I can judge, are very unusual in circumscribed disease of the semicircular canals, but very frequent in diffuse suppurations of the labyrinth. It is very important to watch very carefully after the operation a patient who presents an apparently isolated fistula of the semicircular canal at the time of exposing the middle-ear cavities, so that symptoms pointing to an extension in the inner ear shall not be overlooked. These are primarily the symptoms of irritation, vertigo, nystagmus, then diminution of hearing which was preserved before the operation. As soon as we are assured that the incapsulated suppuration has become extensive, the broad exposure of the labyrinth cavities must be undertaken and performed, on account of the danger of a retention of pus in the interior of the labyrinth. This is the rule by which we have been guided for the last year in the Breslau Clinic. We have but rarely been in doubt as to what to do, except when before the operation there were distinct symptoms of defect and at operation a fistula could not be found proven to exist. In these unclear cases we have waited without having occasion to regret it, though I think this point is still unsettled.

The cases with the formation of sequestra in the labyrinth are to be regarded, for indications to operate, as diffuse labyrinth suppurations.

If the sequestrum is movable at the time of operation on the middle ear, its immediate extraction is recommended, after enlarging the fistula between the middle ear and the labyrinth if necessary. Numerous cases have shown that the very severe symptoms of irritation disappear and the wound first begins to heal when the sequestrum has been removed. Moreover the patient is constantly in danger of the onset of a meningitis. The conditions, however, are quite different if the se-

questrum is not freely movable. In this case it is generally recommended to wait, and von Stein favors this advice because he fears forced loosening of the fragment would cause injury to the carotid. This accident has occurred to him in many cases. It is, however, not to be forgotten that a threatening meningitis is always to be feared, a condition which makes the decision in these cases not an easy one.

Whether it is best to open the labyrinth immediately in accidental operative dislocations of the stapes, cannot be decided at the present time.

As far as I know these attempts have not been made, presumably because the injury has not been recognized during the operation but only by its consequences. If these appear as labyrinth irritative symptoms, we should immediately decide on operation on the labyrinth, for the previously published fatal cases—to which I regret to have to add another—unquestionably demonstrate the danger which the patient runs without operation.

OCULAR AND ORBITAL SYMPTOMS IN DISEASES OF THE SPHENOIDAL CAVITY.

REPORT OF A CASE WITH AUTOPSY

BY DR. HERMANN SCHROEDER, ERLANGEN.

Translated from *Zeitschrift f. Ohrenheilk.*, Vol. LIII., 1906.

THE monographs treating this subject are the following: Eversbusch, "The Diseases of the Eye and their Relation to Diseases of the Nose, of the Accessory Cavities, and of the Ear." (*Graefe-Saemisch Handbuch der gesamten Augenheilkunde*, vol. ix., Chap. 16, 2d edition, Leipzig, 1903.) This contains a review of the literature for 100 years, from 1803 to 1903. In 1902, Stanculéanu published "The Anatomic and Pathologic Relations between the Sinuses of the Face and the Orbito-Ocular Apparatus" (Paris, Steinheil, 1902). In 1905 and 1906 appeared Moreau's paper on "The Oculo-Orbital Manifestations of Sphenoidal Sinusitis" (Lyon, Schneider, 1905), and Baumgarten's "Acute Inflammations of the Eye Following Acute Affections of the Nose." (*Monatschrift f. Ohrenheilkunde*, 1906, No. 5.)

I shall draw upon these papers for all that concerns the anatomy, pathology, and clinical course of the diseases of the sphenoidal cavity and their relations to the orbit. In general it may be said that the accessory cavities of the nose are directly adjoining to the orbit above, at the inner side, and below. The bony partition is not thick and very frequently there are congenital defects, so that the periosteum or the mucous membrane of an

accessory cavity directly meets the periosteum of the orbit. Moreover the bony wall is perforated by suture lines, blood-vessels, and nerves, which all may furnish opportunities for extension of a pathologic process. There is close relation in the nutrition of these areas through the lymph vessels, the ethmoidal and the ophthalmic arteries; also the fact that the ophthalmic vein receives venous blood from the nose and its accessory cavities. Eversbusch cites personally observed cases showing the intimate relation between the orbit and the nasal cavities and the consecutive frequent coincidence of diseases of the eye and of the nose. He has repeatedly observed that the onset of sympathetic inflammation of the second eyeball was preceded by a marked swelling of the mucous membrane of the nose, which remained regularly localized to the corresponding side of the nose and then extended to the other side. After removal of the primarily diseased eye, among the prodromal signs of an involvement of the other eye was a swollen condition in the nose. Eversbusch even regards the findings in the nose as an indicator to determine the timely enucleation of the diseased eyeball. During the enucleation of the diseased eye this author permits the bleeding to continue, in order to permit the anastomoses of the nose to be freed of their toxic substances. For this same reason he does not suture the conjunctiva and does not apply a pressure bandage.

He has frequently observed exacerbations of sympathetic iridocyclitis to be associated with marked catarrhal symptoms in the nose, or, if these were already present, with an increase of the symptoms, of which the patient generally was himself conscious.

As regards the special anatomy of the sphenoidal cavity, its wall takes part in the formation of the posterior-internal surface of the orbit in 65% of the cases, and, according to the investigations of Bertemès, to an extent varying between 5 and 14mm (Stanculéanu). This

bony partition between the sphenoidal cavity and the orbit is usually very thin ($\frac{1}{2}$ mm). Various investigators have observed small dehiscences (Berger, Holmes, and Gallemann). In these cases the mucous membrane of the sphenoidal cavity is directly adjoining the nerve-sheath of the optic nerve and the ophthalmic artery, so that it is apparent that an inflammation of the cavity can easily invade this structure.

The sphenoidal cavity not only borders on the optic-nerve canal but also on the sphenoidal fissure and comes into relation with the various structures which pass through this fissure to the orbit, to the eyeball, and to the forehead. These are the oculomotor nerve, the trochlear nerve, the first branch of the trigeminus, the abducent nerve, and the ophthalmic veins. Farther backward in the direction of the interior of the skull the cavernous sinus lies next to the upper half of the lateral wall of the sphenoidal cavity; and it is especially important to remember that the oculomotor and abducent nerves in their course through the cavernous sinus are contiguous to the wall of the sphenoidal cavity. In the depression of the sphenoidal bone which contains the cavernous sinus, the bony wall of the sphenoidal cavity, especially when this cavity is broad, is exceptionally thin, and Zuckerkandl has drawn attention to the occurrence of dehiscences, though these are not so frequent as in the bone next to the optic-nerve canal.

Congenital defects in the region of the sella turcica have been observed by a number of authors, and Stancu-léanu regards this area as a site of predilection for pathologic perforations. I mention this because in our case a perforation was found in this region. Some other cases of a similar nature will be cited.

The numerous vascular communications between the blood channels at the base of the skull and the bony substance of the sphenoidal body, and with the mucous lining of the sphenoidal cavity were mentioned by

Moreau. These may facilitate extension of a suppuration from the sphenoidal cavity to the blood channels and to the meninges.

Generally the two sphenoidal cavities are separated by a thin but complete bony septum. Defects in the septum have, however, been observed by Hajek and Zuckerkandl.

The two cavities are frequently not of the same size, and the septum may be displaced laterally. This may be so marked that a complication of the orbit of one side may be due to an inflammation of the sphenoidal cavity of the opposite side.

With the increase in size of the sphenoidal cavities the thinness of the wall is proportional, and therefore extension of any suppuration to the important neighboring organs is facilitated.

These unfavorable conditions are present when the processes of the sphenoidal bone are converted into pneumatic cavities.

If this change involves the small wings of the sphenoid, then the optic nerve is completely enclosed by empty cavities and the danger of its involvement is naturally much greater.

This change, if it extends downward and outward, may bring the diseased cavity into direct relation with the round and oval openings, and this abnormal formation may be so pronounced that the sphenoidal cavity and the cavities of the superior maxilla become so nearly approximated to one another that only a thin bony partition intervenes. In these cases the supramaxillary nerve is very apt to be involved; the pain experienced below the eye may simulate disease of the antrum of Highmore even when the sphenoidal cavity alone is involved. On the other side, a healthy sphenoidal cavity may be infected from a diseased antrum and thus lead to a fatal intracranial complication. This may occur when the sphenoidal cavity is of normal size and when

the cavity of the superior maxilla is dilated in the form of a sphenoidal recess (Zarniko).

The soft parts may be involved in the pterygo-palatine sulcus and in the retromaxillary fossa in a suppuration of the sphenoidal cavity, as is readily explained by their anatomic relationship.

Of considerable importance are the size and position of the opening of the sphenoidal cavity. The smaller the opening the more likely is this opening to be occluded by inflammatory swelling of the mucous membrane and thus cause pus to accumulate under pressure within the cavity. The situation of the ostium nearer the roof than the floor is unfavorable. Thus the escape of pus is rendered more difficult and in the dorsal decubitus only occurs when the cavity is entirely filled. These patients usually empty the contents of this cavity in the morning by holding over their heads.

Mention should also be made that a posterior ethmoidal cell protrudes sometimes to a considerable extent into the corresponding sphenoidal cavity; this is important to remember when operating. The distance between the ostium and the external opening of the nose is important for the purposes of probing; numerous measurements have given this as about 7cm.

The discovery of this ostium has been facilitated by the introduction of Killian's speculum; the probe is of course to pass the middle turbinal at its middle.

There are cases, even after the use of cocaine, where the olfactory fissure does not permit a view of the anterior surface of the sphenoidal cavity and of the sphenoidal ostium, and the introduction of a probe is difficult. In these cases, according to Hajek, the middle turbinal must be resected. In my opinion, when the septum is deviated a submucous resection should be undertaken.

As regards the clinical manifestations of an empyema of the sphenoidal cavity, I should like first to mention

that Hyrtl, in 1882, stated that the sphenoidal cavity was utterly beyond manual and instrumental intervention. Though this statement has been in recent years completely refuted, the surgery of this cavity is extremely difficult and the knowledge of its diseases and complications is not thoroughly understood. We should not, however, forget that diseases of the sphenoidal sinus and their complications frequently make but few signs during life and are often not discovered until autopsy. In addition to the condition of the nose, the most regularly found symptoms are the following: dull sensation in the middle of the head, occipital pain, neuralgia, lachrimation, swelling of the lids, immobility of the eyeball, protrusion of the eyeball, thrombosis of the ophthalmic veins, and disturbances of vision.

The symptom of lachrimation has been observed a number of times, though it is questionable whether this symptom is present in isolated disease of the sphenoidal cavity.

More frequent are neuralgias, especially in the distribution of the frontal, supraorbital, and infraorbital nerves. Their relation to the sphenoidal sinus has been described. In the presence of neuralgia of these nerves, when we do not know a definite cause, the nose should always be examined.

The subjective symptoms, as far as they involve the sensory nerves, have been carefully described by Schaeffer, who distinguishes between acute and chronic disease of the sphenoidal cavities. In the former, the patients have complained of excessive pain in the region of the forehead, in the occiput, in the middle of the head, and sometimes in the depth of the skull. In chronic disease, vertigo, supraorbital neuralgia, frontal headache, etc., are present. These vary in severity and the patient may be unable to follow his work.

In one case of Hajek's the pain was localized to the left supraorbital area, though the sphenoidal cavity of

that side alone was involved. In our case the frontal sinuses were healthy, but severe pain in the region of the left frontal sinus was pronounced.

The cerebation of the patients, the ability to concentrate, and the memory were all affected. In some, conditions of depression have been caused, even leading to attempts at suicide.

Of ocular symptoms, scintillating scotoma was observed most frequently. In some cases disturbances of accommodation have been observed. The intimate relationship of the oculomotor nerve to the sphenoidal cavity in the cavernous sinus has been described. It is possible that these fibres are the first ones to be involved. When the process extends, the entire oculomotor trunk and the abducent or the trochlear nerves may also be paralyzed. These same symptoms may be produced by an otitic condition. Bircher has reported a case of phlebitis of the transverse, of the inferior petrosal, and cavernous sinuses, where pus had extended to the apex of the petrous pyramid. There were irritation of the trigeminal nerve and oculomotor paralysis. After removal of the pyramid, recovery took place. Isolated paralysis of the abducent nerve of otitic origin has been repeatedly observed. A description of all these cases and of the path of infection has recently been given by Alt (*Monatschr. f. Ohrenhkl.*, 1906, No. 2).

Whether paralysis of all the external ocular muscles is sufficient to explain exophthalmos is difficult to explain. As a rule, this symptom is due to oedema of the orbital tissue or to some retrobulbar process. An inflammatory exophthalmos is generally associated with an oedema of the lids and chemosis. As both of these conditions were absent in our case, I think an exophthalmos can occur from simple muscular paralysis.

The path by which disease of the sphenoidal cavity may lead to a retrobulbar inflammation and then to exophthalmos has been mentioned. The severe conse-

quences of pressure upon the optic nerve and the nutrient blood-vessels are apparent.

As regards etiology, only as much will be touched upon as is necessary to elucidate our case of erysipelas. According to Eversbusch, it is generally impossible to say whether the affection of the nasal accessory cavities or the erysipelas was the primary condition. Weichselbaum has shown that erysipelas of the face may be the primary focus of infection. On the other hand, a number of cases have been reported by Hajek in which the nasal empyema had preceded this affection. This author has also observed cessation of attacks of erysipelas after the healing of chronic empyema.

According to Moreau, of his 13 cases 2 were due to erysipelas; in our case everything seems to speak for erysipelas as the primary affection.

There is another path of infection to the sphenoidal cavity, namely by way of the palatal tonsils. Moreau has described one of these cases.

A patient suffered from headache and vomiting for 11 days after onset of a purulent tonsillitis. There were oedema of the eyelids and left-sided exophthalmos with high fever and rigors. Notwithstanding an incision into the orbit, the patient died.

The autopsy revealed a thrombus of the coronary and cavernous sinus with necrosis of the body of the sphenoid; meningitis and gangrenous areas in the frontal lobe. Pus filled the space between the dura and the sella turcica.

There are two ways by which infection may travel from the tonsils to the sphenoidal cavities: (1) directly along the mucous membrane of the naso-pharynx; (2) by the blood and lymph channels; the lymphatic network of the sphenoidal bone stands in communication with the pharyngeal lymph glands.

Eversbusch has reported 8 autopsies of isolated suppurations of the sphenoidal cavities. In 6 of these the path which the pus followed to gain access to the interior

of the skull was accurately determined; in 4 through the diploë of the upper wall, in 2 by perforation. Moreau has described 13 autopsies where a perforation was found in the upper wall in 3. In one of these cases the perforation had a diameter of 3-4mm, and was situated in the middle line of the anterior half of the sella turcica.

On careful examination it was seen that the septum of the sphenoidal cavities was deflected to the right; the perforation was consequently in the left cavity. This was filled with pus and the mucous membrane was thickened; the right sphenoidal sinus contained clear mucoid fluid.

Another case of perforation is our case.

A few words regarding prognosis and treatment. The prognosis is always serious on account of the proximity of vital organs. A perforation through the upper wall may be followed by meningitis and thrombosis of the cavernous sinus. A necrosis of the lateral wall may cause blindness through pressure on the optic nerve or by perineuritis, exophthalmos, retrobulbar abscess with consecutive meningitis.

Schaeffer has reported the following remarkable terminations:

Gradual separation of isolated parts of the sphenoidal body without causing any disturbance of vision, but finally followed by meningitis;

Sudden discharge of a large part of the sphenoidal body through the nose;

Fatal hemorrhage from perforation through the wall between the cavernous sinus and the sphenoidal cavity;

A retropharyngeal abscess.

Treatment consists in a broad opening with removal of all diseased parts. The endonasal methods have been described.

Recent publications on this subject are those of:

Onodi: "On the Broad Endonasal Exposure of the Sphenoidal Cavity." (*Arch. f. Lar.*, vol. 16, No. 3, p. 454.)

Stoeckel: "Broad Endonasal Opening of the Sphenoidal Cavities with the Burr." (*Arch. f. Lar.*, vol. 17, p. 496.)

Hajek: "The Diagnosis and Intranasal Surgical Treatment of Suppurations of the Sphenoidal Cavity." (*Arch. f. Lar.*, vol. 16, 1, p. 105.)

The after-treatment is described in Schaeffer's monograph.

In 1893 Jansen described a method of operating from the frontal bone. He opens the frontal sinus, resects the floor and the greater part of the orbital process of the frontal bone, and then passes through the ethmoidal cells to the sphenoidal cavity.

In 1897 Jansen suggested another method at the Congress in Moscow, namely, through the maxillary sinus. He has made use of this method in a large number of cases, but only in those cases where the maxillary cavity was diseased. Furet opens the healthy maxillary cavity in order to reach the ethmoidal cells, and exposes the anterior and external wall of the sphenoidal cavity. He regards this method as better than any other.

Whether it is justified to open the healthy Highmore antrum in order to reach the sphenoidal cavity is still a disputed question. Owing to the dangers which a supuration in the sphenoidal cavity offers, this operation would surely be justified in certain cases, and, if the operation must be done, it is best to select that method which gives us the broadest exposure. Recently Denker has suggested a method which would serve for thorough exploration of the sphenoidal cavities. (*Münch. med. Wochenschr.*, No. 20, 1906.)

This method has the important advantage that no external wound is made, and that after-treatment can be carried on from the nose. Moreover the operation is one-sided and can be carried out without any danger of aspirating blood. Stoeckel complains of severe hemorrhage which results from removing the posterior ethmoidal

cells; consequently after packing for a few days he proceeds with the operation. This method is, of course, not suited when threatening symptoms are present.

Our case is as follows:

M. K., twenty-eight years of age, admitted May 5, 1906.

As a child, had had measles and scarlet fever with some aural complications. Four weeks ago the nose began to swell and become red, with the formation of vesicles (erysipelas?). This was followed by headache which became steadily more severe. Eight days ago the patient complained of vertigo and was unable to stand alone or to walk. There was some pain experienced in the left ear.

Two years ago the patient received a number of injuries about the head which kept him in bed for two weeks.

On Admission.—Moderately well-developed man. Sensorium somewhat clouded. Sways on standing, and cannot walk long but falls to the left side. Turning his head is not painful. On bending the head forward there is distinct pain and rigidity of the neck. Herpes of the lips. Pulse, 72; temperature, 38.6° C. The abdominal reflexes are somewhat exaggerated. Kernig's sign absent. Urine normal.

Eyes: Marked exophthalmos left. Movements restricted, especially outward. Marked horizontal nystagmus.

Ears: right, *Mt* clouded; left, the inner part of the canal wall is very red. The soft parts about the apex of the mastoid are infiltrated, continuous with a swelling in the neck. The lower part of the mastoid process and the soft part surrounding are tender.

Functional examination: right, voice 2cm; left, whisper 8cm. Lower tone limit, right and left, D². A lateralized to the right ear, — 45'. Rinne, on both sides, + 12'. Galton, right, 0.7; left, 1.5.

There are no abnormalities to be seen in the nose.

May 5th.—Lumbar puncture performed; a somewhat clouded cerebrospinal fluid evacuated. This fluid contained diplococci which were regarded as meningococci. On culture, yellow staphylococci developed.

May 6th.—Marked nystagmus. On looking up, the left eye does not follow. There is moderate exophthalmos.

Pupils are medium; react to light. Left, the eye-grounds are both normal.

Operation.—The mastoid process and the posterior cranial fossa were exposed. The mastoid process and the antrum proved to be normal. Through the exposed cerebellar dura a number of perforations were made in various directions without result.

May 7th.—Pulse 60; temperature, 37.4°–38.6° C. Left-sided facial paralysis. The movements more restricted, especially outward. Left ptosis. Right, beginning paralysis of the abducent. No hemianopsia; no nystagmus and no Kernig. The trigeminal area normal. Moderate tenderness over the floor of the left frontal sinus. Rigidity of the neck. Tenderness of the back.

The symptoms of meningitis became more marked and the patient died on May 13th.

Autopsy.—Purulent empyema of the sphenoidal cavities. Purulent thrombophlebitis of the cavernous sinus, of the superior petrosal sinus, of the bulb of the jugular vein and the neighboring parts of the sigmoid sinus, and of the jugular vein. Extensive subdural suppuration in the area of the sella turcica and of the left wing of the sphenoid. Purulent meningitis of the base extending to the convexity of the right hemisphere. Enormous hyperæmia of the pia. Pulmonary infarcts. Splenic tumor. Acute nephritis with abscesses.

A careful examination of the base of the skull revealed marked hyperæmia of the inner surface of the dura above the clivus and the surrounding parts.

On cutting into the hypophysis very thick pus was evacuated from the sella turcica.

Both frontal sinuses are found normal; also the maxillary antra.

There was a phlegmonous inflammation in the soft parts behind the left angle of the jaw.

This purulent infiltration extends upward to the base of the skull surrounding the internal carotid artery, which contains fluid blood and a parietal thrombus.

The internal jugular vein is thrombosed. The thrombosis extends into the bulb and then into the left sigmoid sinus.

The left petrosal sinus contains a disintegrated thrombus which continues into the left cavernous sinus.

The entire dural covering of this part of the base of the skull is separated from the underlying bone by yellowish-green purulent masses.

The left cavernous sinus is completely filled with pus.

The oculomotor nerve is surrounded by these purulent masses. The sheath of the optic nerve and the contents of the orbit appear normal.

The right sphenoidal cavity contains mucoid, fetid, purulent masses. In the left the mucous membrane is swollen; there is, however, a little pus in the deepest part of the cavity. Both ostia are very narrow, hardly permitting the entrance of the probe. There is no pus in the nose.

The left sphenoidal cavity shows a perforation in the sella turcica as large as the head of a pin in direct communication with the above-described enormous collection of extradural pus.

Remarks.—Baumgarten has reported a number of cases where prompt endonasal treatment has cured a severe orbital condition. I shall briefly quote two in which the ocular complications were removed after operating on the sphenoidal cavity.

Case 1. Paresis of the internal rectus and inferior oblique, with diplopia, following an affection of the sphenoidal sinus.

As there was no cause found for this diplopia, the patient was referred to the nose department. ("Acute Inflammation of the Eye Following Acute Affection of the Nose," *Monat. f. O.*, vol. xl., 5, 1906.)

The various accessory cavities were found normal, except the sphenoidal cavity. On probing this cavity a bloody fluid was discharged. At that same moment the patient said that she again saw as well as ever. The weakness of the two muscles disappeared completely.

Case 2. A girl eighteen years of age presented a recurring exophthalmos on the left side. The eye is otherwise normal. There is nothing found in the nose, but

from the experience in the preceding case it is decided to probe the left sphenoidal cavity. This was followed by the discharge of a great deal of bloody fluid. The patient said immediately that the eye had returned to its place, and during an observation of four weeks the old condition did not recur.

Baumgarten believes that chronic swellings in the nose had closed the sphenoidal ostium and that the retained secretion pressed upon the blood-vessels of the orbit. It would seem well to explore more frequently the sphenoidal cavity.

A case which resembles mine in many ways is that published by Finlay (these ARCHIVES, vol. xxxii.).

A young man had suffered from purulent otitis on the left side for several weeks. He was brought to the hospital in a comatose condition with paralysis of the external rectus and symptoms of stasis of the left ophthalmic vein. Below the upper orbital margin there was a swelling like a leech. The mastoid process was opened and the transverse sinus was exposed. Nothing abnormal was found. The middle cranial cavity was explored without result. The patient died.

At autopsy the skull and cavernous sinuses were occluded by a purulent thrombus, which continued into the left ophthalmic vein. The sphenoidal cavity and the posterior ethmoid cells were filled with thick, yellowish pus. There never had been any signs of a nasal trouble.

As to the individual symptoms of my case, many otologists, as Hinsberg stated in his introductory paper on "Labyrinth Suppurations" at the last meeting of the German Otological Society, do not differentiate between true nystagmus and nystagmus-like movements. Barany has suggested an "undulating" nystagmus and a "rhythmical" nystagmus. This choice of words seems to be happy, though we must more clearly define the term "nystagmus." In our case it was necessary to determine whether the nystagmus was the one which is

associated with paresis of the ocular muscles or with a localized cerebral trouble or with diseases of the vestibular apparatus. As the ear and the cerebellum were found normal, we were inclined to regard the horizontal nystagmus as a process of external ocular muscles. If the paralysis attacks any one muscle, the variety of nystagmus can be easily determined, but if there is a paresis of all the muscles, the distinction between this variety and vestibular nystagmus becomes more difficult. In cerebellar nystagmus this condition is usually a symptom of a tumor or of an abscess in the cerebellum. On the other hand, all processes in the posterior cranial fossa which decrease the space in this cavity may cause nystagmus, as meningitis and hemorrhages. Pressure on the vestibular nerve at the base of the brain must be thought of. Basilar meningitis and hyperæmia of the pia in our case, however, could not exert such a pressure. I am more inclined to regard the nystagmus in our case as being due to a process of the ocular muscles, though the vertigo and the tendency to fall to the left suggest the first explanation, especially as the facial nerve was also involved. The paresis of the ocular muscles and the ptosis can be easily explained by an involvement of the nerves near the sphenoidal cavity. The relations of the oculomotor nerve to the pupils and to the lens have been described. The vision and field were not examined.

Neuralgia appeared in a peculiar form; the floor of the frontal sinus was very tender, although at autopsy the frontal sinuses were found normal.

The progress of the meningitis was also shown by the later appearance of Kernig's sign.

The pain and swelling along the left side of the neck and over the apex of the mastoid process with a negative aural condition resulted probably from an infection secondary to a purulent thrombosis of the jugular vein. In our case the pus had travelled from the interior of the skull to this area through the foramen ovale along the third branch of the fifth nerve.

REPORT OF THE TRANSACTIONS OF THE NEW YORK OTOLOGICAL SOCIETY.

BY THOMAS J. HARRIS, M.D. SECRETARY.

MEETING OF MARCH, 26, 1907.

Dr. BRYANT reported a case of **carcinoma of the middle ear**.

Male, forty-one years old, with history of old otorrhœa, presented a polypoid growth in the left external auditory canal, indefinite pain in the head, paralysis of sixth and seventh nerves. The growth was removed by a curette and found to occupy the depth of the auditory canal, arising anteriorly, external to drum-membrane. Examination showed it to be carcinoma. The radical operation was performed, followed two weeks later by recurrence. This was then treated by radium, with no improvement. The headache became worse; the growth extended into naso-pharynx, nose, and orbit, involving the fifth, sixth, seventh, tenth, and eleventh cranial nerves. Death after six months. No autopsy.

Discussion.—Dr. GRUENING said that when he saw the case there was a herpes of the face which in his opinion indicated the involvement of the Gasserian ganglion and suggested that the disease may have proceeded from inside outward.

Dr. ARNOLD KNAPP said that when he saw the case in June of last year there was only a paralysis of the 6th nerve; there was nothing to call attention to any involvement of the ear. He also referred to a case of a tumor presenting in the external auditory canal which he had seen where there was a similar paralysis of the 6th nerve.

Dr. WILSON stated that there had been no recurrence in his case of carcinoma of the ear which had been treated with radium.

Dr. DENCH referred to a case of an infant who had, in connection with disease of the mastoid, a fibroid growth of the auditory canal. The operation showed small round-cell sarcoma of the mastoid and canal. The wound had nearly healed when the child disappeared from the clinic. Later it returned with the external wound entirely healed, but a discharge still from the ear. The child had had X-ray treatment, he learned. He then tied the common carotid to check, if possible, the growth of the sarcoma. The child, however, finally died.

Dr. DENCH spoke also of a case where the microscopic examination showed epithelioma. There was no recurrence after operation, illustrating the fallacy of the microscope at times.

Dr. MAY reported a case of **anomaly of the lateral sinus**, occurring in a child of six. The usual mastoid operation was performed. After the operation the temperature continued elevated and somewhat suggestive of sinus involvement; respirations 38, and pulse 128. At the end of a week a second operation was performed. The sinus was exposed and was found normal above the entrance of the emissary vein. Below this point there was the appearance of a diseased sinus. An incision showed, however, that this was dura, and a quantity of cerebro-spinal fluid escaped. The jugular was then ligated and excised; it was found to be very small and contained a little blood, the examination of which was negative. Further exploration did not discover the remaining portion of the sinus and he was forced to the conclusion that it was absent in this locality. After the operation the temperature dropped to normal and continued so, and the patient made a complete recovery.

Discussion.—Dr. GRUENING said that he had seen the operation and at first thought that the escape of cerebro-spinal fluid indicated that the incision was between two thrombi in the sinus, a condition which he had seen. The disappearance of the sinus below he regarded as a pathologic condition and not as an anatomical anomaly.

Dr. DENCH said that he had seen such obliteration of the lateral sinus in a case of chronic middle-ear suppuration.

Dr. PHILLIPS reported a case of **tumor of the face** in a girl

of ten. This had existed for some time and gradually grown till it had separated the cartilaginous from the bony attachments of the external auditory canal. It now involved the canal itself and extended half forward on the jaw.

Dr. PHILLIPS spoke of the favorable result of **firm compression over the two internal jugulars**, in a case of brain abscess, during operation, to evacuate the pus. This had been effectual in draining off over one and a half ounces. In a second case where the method was used the result was equally good.

Dr. PHILLIPS in answer to an inquiry said that of the two cases of mastoid operation complicated by diabetes the woman with a high percentage of sugar had not done satisfactorily; the wound was very slow in healing.

Discussion.—Dr. KIPP reported the case of a child who had a large furuncle in the external canal of the left ear and who suffered from diabetes. An incision was done under ether. The child died twelve hours later in coma.

Dr. McKERNON reported the case of a girl of sixteen who had 4.61 per cent. of sugar in the urine and upon whom he had operated for acute mastoiditis. For six hours following the operation she suffered from coma. After that she became better and recovered without any complications. There was at present 2.5 per cent. of sugar present. He had now seen 13 cases of mastoiditis complicated by diabetes where he had operated, with nine recoveries. He felt that the presence of sugar was no indication in itself against operating.

Dr. DENCH agreed with the views of Dr. McKernon.

Dr. E. F. KRUG reported a case of **acute mastoiditis** complicated by 4 per cent. of sugar. Blebs in the canal hid the drum membrane, which was later seen to be pushed forward by blood in the middle ear. An ice-bag relieved the condition. A similar condition developed in the other ear and two weeks later an abscess in the ear first involved. This was still discharging, though better. Age of patient sixty-nine years.

Dr. GRUENING said that in the cases of diabetes with involvement of the mastoid, the prognosis was distinctly bad when the soft parts were affected. Four Bezold mastoids had proved fatal in his hands. The age of the patient was not so serious a factor.

Dr. LUTZ referred to a case of Bezold mastoid with a trace of sugar in a patient of seventy-seven where there had been a rapid recovery.

Dr. DENCH emphasized the importance of an early operation and the seriousness of a long-standing suppuration.

Dr. KIPP thought that the chief risk was from the anæsthesia.

Dr. McKERNON stated that he always employed chloroform in these cases.

Dr. QUINLAN reported upon a high temperature following an operation for **hypertrophied tonsils and adenoids** in a child of nine years. At the end of two weeks the temperature shot up to 105° with morning rise and evening fall. This lasted for 5 days. Earache manifested itself during this period; canal swollen and drum slightly injected along the handle of the malleus. Blood examination: leucocytosis of 19,000; a subsequent examination made 4 days later showed a count of 11,000; slight mastoid tenderness. A diagnosis of influenza was made by the consultant and this was subsequently verified by the perfect recovery of the child, who is now, 5 weeks later, running a normal temperature. Every indication at the time pointed to an acute invasion of the mastoid.

Discussion.—Dr. DENCH referred to a case of adenectomy which was followed by adenitis and later by acute suppuration of both ears. A temperature of 106° suggested sinus involvement, but the next day this dropped to normal.

Dr. BRYANT spoke of a case of acute otitis media where the polynuclear percentage was 87 and yet an uneventful recovery took place.

Dr. GRUENING said that he did not think that the blood examination could in any way supersede a careful clinical examination nor be compared in value to it.

Dr. KIPP reported a case of cerebro-spinal meningitis in a child of three where the **value of an ophthalmic examination** was illustrated. The child was supposed to be suffering from meningitis. The spinal puncture gave a negative result. The ear had been discharging but was then entirely healed. The child was, however, totally deaf in both ears. The eye examination showed a metastatic irido-choroiditis, which established the diagnosis of cerebro-spinal meningitis. Recovery.

Dr. KIPP also reported a case of otitis media suppurativa of

right ear with double vision. There was a **paralysis of both external recti**. The operation showed an extensive mastoiditis and an extradural abscess containing three drachms of pus. After the operation the paralysis disappeared. He did not pretend to explain the cause of the paralysis.

Discussion.—Dr. DENCH thought that a localized meningitis could account for it.

Dr. ARNOLD KNAPP inquired as to the significance of **persistent pain in the post-mastoid region**. Did it necessarily demand operation in the absence of other symptoms?

Discussion.—Drs. BRYANT and KIPP thought that operation could often be avoided in such cases.

Dr. GRUENING thought that pain in this locality demanded operation if persistent.

Dr. DENCH thought that it was a suspicious sign; it was seen in cases of grippe; it did not call for operation always.

Dr. KNAPP said that the case that he had in mind had a discharging ear for four weeks. This had now practically ceased but there was deep oedema in the posterior triangle; there were no other symptoms of mastoid involvement.

Dr. DENCH thought that oedema in this region always called for an exploratory operation.

Dr. HARRIS referred to a case which he had reported last year, where the pain had persisted for a number of days in the posterior portion of the mastoid and recovery finally took place without operation.

Dr. SHEPPARD spoke of a case with a large area of oedema over the post-mastoid region. The operation revealed a mural thrombus of the sigmoid sinus and the emissary vein blocked.

Dr. GRUENING thought that such cases were the ones that were benefited by the Wilde's incision.

Dr. DENCH reported a case of double mastoiditis. In the course of the operation the sinus was exposed on one side. After the operation the polynuclear count rose, then dropped, and rose again. The supraclavicular glands on the opposite side became involved and were excised under ether. The temperature immediately shot up, and the vein on the side corresponding to the sinus which had been exposed was ligated and a portion excised. The clot which it contained

was found to be sterile. After this the temperature became normal. The Doctor ascribed the fever which had occurred to the infected glands.

Dr. LUTZ spoke of a case of acute otitis media which was followed by an involvement of the other ear. Later a double pneumonia and double mastoiditis developed, and recently he had operated on the patient for an extensive disease of the accessory sinuses of the nose. To-day he is well but is totally deaf.

Dr. DENCH inquired if ice had been used.

Dr. LUTZ said that he had used it for 24 hours.

A general discussion took place which showed that the members, almost without exception, had abandoned the use of ice in cases of mastoiditis.

Dr. LUTZ said he used ice in cases seen very early, before the presence of pus was apparent. After pus is present ice is of no use.

REPORT OF THE TRANSACTIONS OF THE SECTION ON OTOTOLOGY OF THE NEW YORK ACADEMY OF MEDICINE.

REGULAR MEETING, MARCH 8, 1907. DR. WENDELL C. PHILLIPS,
CHAIRMAN.

Presentation of Cases.

Dr. W. P. EAGLETON presented a case showing the presence of von Stein's symptom. The patient, a young girl, had a running ear, which gave her so little trouble that she paid no attention to it. Eight weeks ago, she was seized with a "fainting spell" and fell, but did not lose consciousness. This was followed for several days by nausea, tinnitus, vomiting, and dizziness. Forty-eight hours later she had a marked facial paralysis, and a great increase in the discharge from the ear.

When first seen by Dr. Eagleton, she had become totally deaf in one ear with very marked facial paralysis; had recovered entirely from the dizziness, but was unable to stand on either foot with her eyes open.

She improved rapidly and now, eight weeks after the attack, all the symptoms of facial paralysis have disappeared, she can stand on either foot for several seconds, but is still unable to jump with her eyes open or closed, but can do better with them open than closed. Having done this several times during the last few weeks she can now do it very much better. (Demonstration.) She shows a typical point to which Dr. Eagleton would like to call notice particularly, viz., the feet come forward unevenly, so that after one or two jumps she has to catch herself by throwing one foot out. When she first

tried this she could jump only once and would then fall towards the opposite side.

Dr. BRYANT presented a patient with a small **granulating area** on the upper margin of the oval window just below the facial canal. The patient was a woman forty years of age, very neurotic, who had had a radical operation successfully performed two years ago. There was now some headache, vertigo, and tinnitus. The amount of discharge was slight and not purulent.

Discussion: Dr. PHILLIPS inquired if the patient's eyes had been examined, as this is a differential point of some value. Dr. BRYANT replied in the negative, and in response to another inquiry replied that the granulating surface had not been curetted as he had been watching to see what would develop.

Dr. POOLEY inquired whether the discharge had been examined bacteriologically and by the microscope, and said that he presumed Dr. Bryant had in mind that the discharge came from the labyrinth.

Dr. BRYANT replied to both questions in the negative.

Dr. POOLEY suggested the possibility of a fistula in the labyrinth.

Dr. BRYANT replied that he did not think the discharge had been sufficient to warrant that supposition. At least if there was a fistula in the bone it had been protected on the inner side.

Dr. RICHARDS inquired whether the stapes was still in position, to which Dr. BRYANT replied that he did not know. Dr. Richards then said that he would like to mention a little experiment which he had often tried and which he thought might be of value in certain cases in determining whether or not the labyrinth was involved in a gross pathological change. By introducing gentle intermittent pressure upon the capitulum of the stapes, with the patient under slight anæsthesia, a nystagmus is often made manifest if the interior of the labyrinth is not destroyed. Frequently no nystagmus is noted, but should it occur it would indicate that the labyrinth is functioning and would rather point against its extensive involvement. As the cases of labyrinthine suppuration which he has seen show that the interior of the labyrinth may be involved without any demonstrable lesion in the external

capsule (infection by local extension), the test has a definite field of usefulness.

Dr. POOLEY inquired whether this symptom of nystagmus had been recorded or was an observation made by Dr. Richards himself. To which Dr. RICHARDS replied he had never seen any mention made of the pressure upon the stapes with this end in view, but took for granted that it was a recognized fact that nystagmus might be produced in this way.

Dr. MEIERHOF said that it was difficult to speculate upon the condition, and he did not think it could be determined except by cutting into the ear. There was exquisite tenderness over the mastoid, but much of this might be due to hysteria.

Dr. PHILLIPS said that he had operated the previous week on a chronic case and found some granulations about the window, but could not find the stapes. Some years ago he had performed ossiculectomy upon the same patient. He operated because of the great pain which the patient suffered, due probably to eburnation. During the operation he had made pressure over the oval window.

Dr. THOMPSON said that there was one slight movement but no oscillation of the eye.

Post-mortem report of case of suppurative disease of internal ear. T. R. POOLEY, M. D.

Inasmuch as the opportunity for a thorough post-mortem examination, together with examination of the temporal bone in suppurative disease of the internal ear, must be comparatively rare, I have thought that I could not better add to the interest of the subject under discussion this evening, than by reporting a case which came under my observation many years ago:

Miss L., twenty-three years of age, had suffered from ear-ache and otorrhea since childhood. The discharge would cease for a time, then after severe pain recur. The last attack of this kind, which she said began about four weeks previous to the time I saw her, was accompanied by distinct cerebral symptoms, nausea, vomiting, and vertigo. S. P.: Face pale and very much emaciated, with a chronic cough, and physical evidences of phthisis pulmonalis. Her mother died of phthisis. She complained of constant pain in the ear and vertex. There

was a slight but offensive otorrhoea, which suggested by its smell the presence of diseased bone. She complained of a very distressing vertigo, which was always aggravated when assuming a recumbent posture. There was facial paralysis on the same side as the diseased ear. Examination of the ear after cleansing, showed a large linear-shaped perforation of the anterior-inferior quadrant of the membrana tympani. The mucous membrane of the promontory, which was fully exposed, was pale, and there were several spots of hemorrhage upon it, as well as upon the remnant of membrane. There was no evidence of any inflammatory action in the appearance of the middle ear, nor was the mastoid region either painful or swollen. H=0. V=5/60.

I ventured the diagnosis of extension of the ear disease to the brain, abscess of the cerebellum, and made an unfavorable prognosis. The propriety of opening the mastoid was considered, but the operation rejected as not likely to do any good, as the extension was evidently not by this way. All the symptoms became rapidly worse. The pain was intense, the vertigo such that the patient thought the bed was going round, and although she was excessively weak, she assumed an upright posture most of the time for the relief of this symptom thus afforded. She retained her consciousness until only a few hours before her death. Vomiting was throughout a very distressing symptom. Death took place just one week after I first saw her. Treatment was merely palliative. Steaming the ear gave her more relief than anything else.

The post-mortem was made twenty-four hours after death.

Upon removing the calvarium, an abscess about the size of an English walnut, with a well-formed pyogenic membrane, was found in the left hemisphere of the cerebellum. When opened, it gave issue to most offensive pus. No abnormality of any other part of the brain was found. The abscess itself was distinctly circumscribed, and there was no softening of the brain substance in its vicinity.

The temporal bone was removed for dissection. No evidence of necrosis of the inner surface of the bone could be found, but the part which lay in apposition with the abscess was blackened. The temporal bone, which was kept in Müller's fluid, was examined several months afterwards.

No evidence of necrosis of the surface of the bone; that portion corresponding to the eminences of the cochlea and superior semicircular canals perfectly normal in consistency and appearance. Perforation of the membrana tympani in its anterior-inferior quadrant. The portion of the membrane still existing seemed to be only newly formed connective tissue (probably healed perforation). The auditory canal was opened by sawing in an antero-posterior direction, just in front of the attachment of the drum-membrane, when a small purulent cavity, situated above and behind the tympanum, and communicating with the latter immediately behind the attachment of the membrana tympani, was laid open. No ossicles were present. The mucous membrane was thickened and covered the promontory. The latter was smooth and healthy. At the posterior portion of the necrotic bone and purulent mass lies the facial nerve, which is softened and diminished in volume, while above this point it is quite healthy. The tendon of the tensor tympani was attached to the thickened part of the mucous membrane in its upper portion. The cochlea was opened into by a strong knife. The modiolus was entirely destroyed except at its base; the septum between the three coils was preserved. The soft parts of the vestibule were entirely wanting. The horizontal semicircular canal was absent; the anterior vertical one contained pus, but was still lined by membrane; the superior vertical contained pus, but no lining membrane.

The walls of the vestibule and the bony canals were smooth and surrounded by ivory healthy-like bone. Both the saccule, utricle, and superior and horizontal canals absent; membranous part of the anterior canal present, but bathed with pus, which extended into the vestibule. A bristle passed into the aqueduct of the vestibule failed to reach the surface of the bone. The internal auditory meatus was examined; both nerves at this point healthy, all the other parts of the canal being healthy.

No trace of a necrotic path communicating with the cavity of the skull could be found. The abscess of the cerebellum was probably not of recent origin, since it had such a well marked thick pyogenic wall. Is it not probable that each of the oft recurring attacks of pain, to which the patient re-

ferred, was due to cerebral irritation which lasted for a few days and then passed away, but finally by repeated attacks gave rise to the formation of an abscess?

Another point of interest is the simultaneous existence of labyrinthine and cerebellar disease. I made the diagnosis of the seat of the intracranial disease from the vertigo and unsteadiness of gait. May this not, however, just as well have been caused by the disease of the semicircular canals? I am sorry that I did not notice more particularly whether the staggering in walking was towards the affected side, as this might have enabled me to have included the probability of the inner ear being disorganized in my diagnosis. But I only saw the patient once before she took to her bed, and then forgot to make the inquiry.

Dr. HARMON SMITH reported a case of **chronic otitis media suppurativa syphilitica**, in which he had removed the internal ear, the report of which had appeared in the *New York Medical Journal*, March 17, 1906.

Dr. RICHARDS said that he had recently operated upon a case presenting some interesting features.

A middle-aged woman, five weeks prior to operation had acute earache, high-pitched hissing noise in the ear, and marked dizziness with a tendency to fall backward. In a few hours, aural discharge and symptoms of mastoiditis supervened. The vertigo continued through the succeeding weeks.

Prior to operation there were vomiting, marked nystagmus, loud noise in the ear, and vertigo. The tendency now was to fall toward the involved side. There was profound deafness with absence of both air and bone conduction.

Operation revealed involvement of the vestibule, semicircular canals and the lower half of the first cochlear whorl. During anæsthesia the nystagmus, which had previously been marked, did not disappear until the semicircular canals had been removed, when it ceased.

Upon emergence from anæsthesia the patient experienced no dizziness, the noise had disappeared and there was no further vomiting, the eyes were steady except when directed to the extreme lateral position of the uninvolved side.

Internal-ear symptoms simulating intracranial abscess, following traumatism to middle ear. JOHN MCCOY, M.D.

Israel I., age thirty-three years; married; native of Russia; was admitted to the service of Dr. John L. Adams at the N. Y. Eye and Ear Infirmary, December 15, 1906.

Has never had any ear trouble prior to the present attack. About three weeks previous to entrance he had an earache in the right ear. The ear drum was incised by a physician, and the ear discharged freely until two days before entering the hospital when the discharge ceased and the pain in the ear returned. His physician was called in again, and this time made four incisions in the drum, using some force and causing severe pain. This was in the morning. That afternoon he attempted to work in his shop (he is a barber by occupation), when he found that he was unable to stand on account of dizziness. He had also headache over the right side of the head. He went to bed, and while in bed that night and the next day and night felt nauseated and vomited twice. His family noticed also that he was drowsy, and that his speech was slow and interrupted. The following day he was brought to the hospital.

Upon examination his countenance appeared dull and apathetic, and on being questioned his cerebration was markedly slow. He spoke in a slow and interrupted manner (scanning speech), and complained of dull headache over the right side of his head.

Examination of the right ear showed no changes externally, no mastoid tenderness. The external canal walls were excoriated and the canal was found to be filled with pus. The membrana tympani was very red and lacerated-looking, and the pus seemed to be escaping from the posterior-inferior quadrant. His hearing was materially diminished, hearing the spoken voice about six feet from the ear. He noticed ringing noises before the paracentesis, but they assumed a different character when the dizziness came on, being musical. The left ear was normal.

Examination of the eyes showed a well-marked horizontal nystagmus of both eyes, and the right pupil was contracted somewhat; and while both reacted to light and accommodation, the right pupil was more sluggish in its action. Both undi were normal. The patellar reflexes were normal on both sides, and all other reflexes were present and normal. His

coördination was good for touching the tips of the index fingers, and for touching finger to nose, although somewhat slow. On making an attempt to walk, he walked markedly to the right, and after taking six or eight steps would fall to the right side unless prevented. Physical examination of heart, lungs, and kidneys was negative. His temperature on admission was 100° F.; pulse 36; respiration 28. The examination of his blood on admission showed: red blood cells 5,500,000; leucocytes, 11,000; hæmoglobin, 92 per cent.; polynuclear cells, 75.8 per cent.

The examination of the aural pus showed a mixed infection, largely staphylococcus.

The patient was put to bed, irrigations given to the affected ear, and dry cold applied to the head. Under this expectant treatment he showed a steady abatement of all symptoms, and a final disappearance of all, except a slight discharge from his ear, when he was discharged from the hospital, January 4, 1907, having been in the hospital nineteen days. He returned to the out-patient department, and his ear discharge ceased about January 30, 1907.

Dr. MEIERHOF said that for the benefit of those who had not seen it, he would like to call attention to a very exhaustive treatment of this subject in the *Transactions* of the German Otolological Society of last year (1906). "Labyrinthine suppuration," by V. Hinsberg, p. 30. It is one of the most complete articles on the subject that has ever been published.

Dr. Meierhof did not think that the cases that had been reported this evening showed positive evidences of labyrinthine suppuration. There was evidence of some kind of pressure—intratympanic—either from gas, granulation tissue, pus, or what not. We get many of these symptoms in cases of inflammation of the middle ear, and patients get well without an operation, but real cases of purulent involvement of the labyrinth are very serious and mostly are demonstrated only at operation.

Dr. POOLBY asked how it could be explained that the complete exenteration of all the temporal bone, removing all the structures of the inner ear, would do away with the essential symptoms of labyrinthine disease—the dizziness, nausea, and ataxia. This is the essential symptom. The disease

destroys the labyrinth. How then can it be explained that the operation, doing essentially what the disease does, does away with this symptom? He would like to have this point brought home to his mind so that he can understand and believe it.

Dr. CHAMBERS commented upon the progress which had been made in the knowledge and surgical treatment of internal-ear suppuration during the last six or eight years.

Dr. RICHARDS replied that the opening of the labyrinth was a very serious thing. He had operated upon ten cases and had lost three. He had been struck by the frequency with which infective sinus thrombosis complicates labyrinthine suppuration, existing in three of the ten cases mentioned. He did not feel that it was a justifiable procedure to open the labyrinth upon symptoms, as vertigo, vomiting, nystagmus, etc., are so often due to causes entirely extra-labyrinthine.

In answer to Dr. Pooley's question as to why removal of the arches of the semicircular canals, the vestibule, and the first whorl of the cochlea, in the case mentioned, did away with the symptoms of vertigo, nystagmus, and disturbed equilibrium, he did not know, but merely recorded it as a fact.

Dr. EAGLETON said that he had hoped to bring another patient before the Section to-night, who had been operated on for labyrinthine suppuration, but the patient had left the city. He had therefore brought the one whom they had seen.

Dr. Pooley had asked why these cases recover from their dizziness and peculiar gait. This is a very pertinent question. They do recover, and the explanation is very simple. The labyrinth is really a part of the cerebellum. It is one of the tracts which leads to the cerebellum, and has to do with co-ordination. As long as the labyrinth is a source of irritation, it irritates the cerebellum, causing vertigo, but by removing or draining the labyrinth, the irritation is removed, so curing the vertigo, nystagmus, etc.

Paper.

The value of von Stein's symptom in the diagnosis of labyrinthine suppuration. W. P. EAGLETON, M.D. (Published in full on pp. 257-262 of this issue.)

Discussion: Dr. RICHARDS said that he had been very much interested in Dr. Eagleton's paper, but that the test to which he referred was subject to numerous errors. If, for instance, a patient is made to jump as indicated, with the eyes closed, he may tend to fall from a variety of causes independent of any labyrinthine disturbance. First, through any irregularity of muscular action of the two sides, as to hesitation due to fear of falling—a badly arched foot, irregularity in length of limb. A patient, if he be right-sided (handed), attempting to jump in a straight line as in the test mentioned, will deviate to the left and eventually so tend to fall if the eyes are closed. Under normal conditions he is kept in alignment, and in a condition of equilibrium, through his ability to orient. With the eyes closed (as in the test), the supporting influence which orientation gives to the preservation of equilibrium is cancelled. As a result, a disturbance of the statical sense occurs, which may be totally independent of a labyrinthine lesion.

Second, as the patient hops along, he is not in contact with the floor a sufficient length of time to gain a correct subjective appreciation (through what we may term the muscular sense) of his proper relation to the objects about him, or to the floor upon which he moves. The test consequently tends to produce a condition of disturbed equilibrium by disconcerting the muscular sense.

Von Stein's test is not only subject to many errors, but it makes no attempt to test the patient's statical sense with reference to definite planes corresponding to the primary planes of the semicircular canal system. It has a tendency also to create a condition of inequilibrium by disconcerting the muscular sense and by suppressing orientation; if, therefore, upon applying the test a condition of disturbed balance is made manifest, we are at a loss to know what factor is responsible; in other words, the test is not a differentiating test.

Further, if the invasion of the labyrinth has been gradual, thus giving the remaining factors (whatever these may be) sufficient time to compensate for the loss, no disturbance of equilibrium may be made manifest by the application of von Stein's test.

In several cases in which he had removed the major portion

of the labyrinth, the patients subsequently do not respond to von Stein's test.

In testing labyrinthine cases, we wish to disturb to a minimum degree all other factors concerned in the preservation of equilibrium. We therefore have the patient first stand with eyes open and note the direction in which he tends to fall. If disturbance of station follows, we may, if we find the labyrinth involved, attribute the disturbance to the definite lesion by elimination.

We next repeat the test with the eyes closed.

If no disturbance of equilibrium is made manifest, we now have the patient stand and move the head as a pendulum upon the body in the planes of the semicircular canals, testing his station with reference to each plane separately.

The eyes should be closed, as moving objects in the field of vision may be a factor in producing dizziness. We here, too, cancel the supporting influence which the eyes contribute to the preservation of station, but with the patient standing still, *i.e.*, with the muscular sense undisturbed, this supporting influence is not so necessary as when the patient is made to jump, as in von Stein's test.

Should no disturbance of equilibrium follow, we should now have the patient stand with eyes closed and rotate the head in such direction as to cause disturbance of the labyrinth fluid with reference to the combined planes of the canals. This quickly causes an exquisite degree of vertigo even in the normal individual.

We should select some given point as the chin, for the sake of uniformity, and state when making the test in which direction this point is made to move—as under normal conditions the chin when rotated from left to right causes the patient to fall to the left, and *vice versa*, the head being rotated as mentioned above.

If after testing a patient and tabulating the resulting disturbances of equilibrium and noting the pathological lesion in the labyrinth and the part of the labyrinth involved we may hope to make some progress in labyrinthine localization.

Dr. T. R. CHAMBERS inquired concerning the age of the patient. If the patient were sixty years old, would the symptom be of service?

Dr. EAGLETON said that Dr. Richards proposes a substitute for von Stein's symptom but gives no data. On the other hand, with von Stein's test he had diagnosed eight cases of labyrinthine suppuration without other symptom and operated upon them at the Newark Eye and Ear Infirmary.

There have been seven cases of labyrinthine suppuration, in five of which von Stein's symptom was known to exist. It probably existed in all seven, but they were tested long after drainage of the labyrinth, and the symptom had disappeared.

Dr. Richards had spoken of its being very dangerous to enter the labyrinth. It certainly is, if an attempt to extirpate the labyrinth is made; but if a fistula is found and carefully followed until the end of granulations is reached, without ever probing beyond what is actually seen, the procedure is safe. Excellent results had been attained at the Newark Infirmary in this way, viz., leaving the granulations alone, and simply enlarging the fistula as far as possible so as to have free drainage without disturbing healthy labyrinthine tissue.

In all the cases which had been operated upon, there had been only one death, and this was a tubercular case which died some time later.

He had not spoken of von Stein's goniometer for he had had no personal experience with it.

Von Stein uses a special apparatus on which the patient is placed with the feet close together, with eyes open or closed. Von Stein has found in a number of cases that he can diagnose the particular canal which is involved, but they all have a limitation of the angle of inclination.

He simply brought von Stein's symptom forward as one that should be tried in every case where labyrinthine suppuration is suspected.

The patient that he hoped to bring this evening was a Greek with a chronic running ear, but no other symptoms, but because he could not jump, suppuration of the labyrinth was suspected, and he was operated upon and the labyrinthine suppuration was found.

Dr. PHILLIPS said that he had seen the case which Dr. Richards had reported, and the patient could not jump and could not stand on one foot.

Dr. EAGLETON said that he had been careful to mention that the symptom occurs in Ménière's disease, and in all affections involving the labyrinth. If we would only think of the semi-circular canal not as a separate organ, but as being an end arm of the cerebellum, which it really is, but which can be cut off without injuring the cerebellum, we would simplify matters. As long as it is irritated it gives symptoms, but when the irritation is relieved the symptoms cease.

REPORT ON THE PROGRESS IN OTOTOLOGY DURING THE THIRD QUARTER OF THE YEAR 1906.

BY PROF. ARTHUR HARTMANN.

Translated by Dr. ARNOLD KNAPP.

ANATOMY AND PHYSIOLOGY.

217. ZUCKERKANDL. On the anatomy of the Eustachian tube. *M. f. O.*, 1906, Nos. 1, 2, and 9.

218. ONODI. On the membranous parts of the so-called fontanelle of the middle meatus. *Arch. f. Laryngol.*, vol. xviii., 3.

219. BOENNINGHAUS. On the present status of Helmholtz's resonance theory. *M. f. O.*, 1906, No. 3, p. 140.

217. ZUCKERKANDL. *On the anatomy of the Eustachian tube.*

This is a continuation of previous publications on this subject. The author has examined the anatomical peculiarities of the Eustachian tube in an additional series of vertebrates of various species. In the grouping of the varieties of Eustachian tubes, the greatest difference has been found in the structure of the tubal walls, especially of the median wall. While the lateral wall in all species has an approximately uniform appearance and is usually fibrous, the median wall shows numerous transitional forms, from fibrous to cartilaginous. This fact, that in the lower forms of vertebrates the median wall is usually fibrous, shows that the primitive form of the Eustachian tube was represented by a fibrous tube.

WITTMACK.

218. ONODI. *On the membranous parts of the so-called fontanelle of the middle meatus.*

With the aid of eleven diagrams the relations in the middle

meatus are described, and it is shown that the opening of the maxillary ostium varies in size, and that numerous variations exist as regards the accessory openings. VON EICKEN.

219. BOENNINGHAUS. *On the present status of Helmholtz's resonance theory.*

This is a brief review of the views of various authors of the Helmholtz resonance theory, and a description of the author's personal investigations and views which have appeared in previous publications. WITTMACK.

GENERAL.

a.—REPORTS.

220. DALLMANN and ISEMER. *Annual report of the University Ear Clinic in Halle, from April 1, 1905, to March 31, 1906.* A. f. O. 69, pp. 44-94.

221. HASSLAUER. *Remarkable cases from the Aural Wards of the Military Hospital in Munich during 1904-05.* D. militär. Zeitschrift, 1906, No. 9.

220. DALLMANN and ISEMER. *Annual report of the University Ear Clinic in Halle, from April 1, 1905, to March 31, 1906.*

In this year 2876 patients were treated for 3679 diseases, 602 operations were performed (of which 54 were typical and 108 complete mastoid operations). In the hospital proper, 299 patients were treated, with 10,967 days of treatment.

In addition to the 16 fatal cases, an interesting case is described where, after an apparently simple middle-ear suppuration with periostitis of the mastoid process, there was a large extrasinuous abscess of the posterior cranial fossa found at operation. Four days later the jugular vein was ligated and the sinus opened on account of pyæmic symptoms. The fever continued, apparently caused by a suppuration in the bulb. Owing to the poor condition of the patient, an operation on the bulb was not undertaken. Nevertheless, improvement and recovery. Of the fatal cases five deserve attention, in which death was the result of operations performed upon the patients (in two cases a typical mastoid operation; in two, complete mastoid operations; in one, sclerotomy). In three the extension of the suppuration took place through the oval window, the labyrinth, and the internal

meatus to the meninges; in one case probably the horizontal semicircular canal was injured at operation. ZARNIKO.

221. HASSLAUER. *Remarkable cases from the Aural Wards of the Military Hospital in Munich, during 1904-05.*

In 14 cases of 53 acute otitis media, an operation had to be performed on account of absolute indications. In two other cases the transverse sinus was found directly adjacent to the posterior canal wall, so that the antrum could not be explored. Subsequent exposure of the antrum was not made necessary because the cases recovered. The following cases are fully reported: 1, acute otitis; abscess of the temporal lobe; death. 2, acute otitis; serous meningitis; recovery. 3, acute otitis after measles; perisinuous abscess; recovery. 4, chronic otitis; perisinuous abscess; recovery. 5, cholesteatoma; operation. 7, acute otitis; osteophlebitis; pyæmia.

BRUEHL.

b.—GENERAL PATHOLOGY AND SYMPTOMATOLOGY.

222. HABERMANN. On so-called professional deafness. *A. f. O.*, 69, pp. 106-130.

223. JOUTY. Deafness after epidemic cerebrospinal meningitis. *Annales des mal. de l'oreille*, etc., April, 1906.

224. HAMMERSCHLAG. A case of neurofibromatosis (Recklinghausen's disease) with involvement of the ear. *M. f. O.*, 1906, No. 5, p. 309.

225. FEIN. The importance of the lower turbinal in the patency of the nose. *M. f. O.*, 1906, No. 1, p. 16.

226. JERUSALEM and FAULKNER. On labor pains and their relation to the nose. *Wiener klin. Wochenschr.*, No. 15, 1906.

227. BERNHARDT. On general infections after operations on the nose and pharynx. *Inaugural Dissertation*, Rostock, 1905.

228. URBANTSCHITSCH. On reflex epilepsy. *Wiener klin. Wochenschrift*, No. 39, 1906.

229. HENNEBERT and TRÉTROP. On the objectively perceived entotic noises. *Annal. des mal. de l'oreille*, etc., July, 1906.

230. KUTSCHER. On examinations of the naso-pharyngeal cavity in healthy man for meningococci. *Deutsche med. Wochenschr.*, No. 27, 1906.

231. KRIEGER. Pain in the ear and in the mastoid process in hysterical subjects. *Inaugural Dissertation*, Rostock, 1906.

232. CELIO. Reflex cough in teething children. A contribution to the physiology of sleep. *Österreichische Ärzte-Zeitung*, No. 13, 1906.

222. HABERMANN. *On so-called professional deafness.*

This report includes the clinical examination of 107 cases and the microscopic examination of ten ears which belonged to five cases of professional deafness. In the latter there always was an atrophy of Corti's organ, especially in the lower part of the cochlear base and the vestibular part of the cochlea. These changes are regarded as primary, the degeneration of the auditory nerve fibres as secondary. ZARNIKO.

223. JOUTY. *Deafness after epidemic cerebrospinal meningitis.*

Five case-histories without bringing anything new. The cases were observed during an epidemic in Algiers in 1905.

BOENNINGHAUS.

224. HAMMERSCHLAG. *A case of neurofibromatosis (Recklinghausen's disease) with involvement of the ear.*

This is a case of neurofibromatosis with involvement of the external and middle ears. In the external ear there was a marked stenosis of the auditory canal and an absence of cartilage. The changes in the middle ear were those of chronic catarrh. The causes for the latter condition are to be found in the congenital changes in the course of the cartilaginous membranous tube which prevented normal ventilation of the drum cavity.

WITTMACK.

225. FEIN. *The importance of the lower turbinal in the patency of the nose.*

These investigations depended entirely upon clinical observations. The authors found that the lower turbinal exerts a large influence upon the quantity of the respiratory current. Before undertaking operations on the lower turbinal the importance of each individual part of this bone must be recognized. The enlargements especially of the anterior and posterior extremities influence the quantity of the expiratory air and occasionally change the direction of the current. Moreover, its action in the form of a valve must not be overlooked.

WITTMACK.

226. JERUSALEM and FALKNER. *On labor pains and their relation to the nose.*

The authors irritate the nose in order to artificially produce

labor pains in protracted labor or in abortion or to induce premature labor. The irritant is applied either—1, by the simple probe, when the so-called “genital zones” of the nose are gently massaged; 2, by the faradic current on these spots; 3, by the galvanic current for the electrolysis of the lower turbinal. Irritation in the lower turbinal caused pain in the uterus, while irritation of the tubercula septi produced pain in the small of the back. This is unquestionably a motor reflex from the nasal mucosa to the uterus. At the same time, practically, nasal irritation with the galvanic or faradic current cannot be compared with the other means of inducing labor. Good results, however, were obtained by influencing the severity of the labor pains by cocainizing the so-called “genital spots” in the nose, especially in those cases suffering from dysmenorrhœa.

WANNER.

227. BERNHARDT. *On general infections after operations on the nose and pharynx.*

Eight cases are reported where, after removal of the pharyngeal tonsil, and in two of posterior hypertrophy of the inferior turbinal, scarlet fever appeared. He concludes that this disease is a particular variety of surgical scarlet fever which is characterized by the fact that the traumatism occurs in that place where usually the infection takes place in scarlet fever. The period of incubation is roundly 48 hours, which is, of course, somewhat shortened compared with the period of incubation in ordinary scarlet fever. In all cases the disease was unusually mild and the symptoms in the pharynx were mild. The author believes that the infectious agents were already situated in the mouth and that the operation furnished the inciting cause. An extensive hyperæmia of the pharynx was produced, causing a relaxation of the epithelium and the means of access for the infectious germs, or by the incision micro-organisms were forced into the lymphatic vessels or from the necrotic false membrane which soon covers the gaping lymph- and blood-vessels. Finally a case is reported where, following the removal of the pharyngeal tonsil, articular rheumatism developed.

SUCKSTORFF.

228. URBANTSCHITSCH. *On reflex epilepsy.*

The author reports a case where a radical operation caused

complete recovery from epileptic attacks which had existed for fifteen years. After a certain length of time another attack appeared. The epilepsy was again cured by another operation.

WANNER.

229. HENNEBERT and TRÉTROP. *On the objectively perceived entotic noises.*

In all four cases which affected the right ear the noise was of arterial nature, namely synchronous with the pulse and influenced by compression of the carotid artery. Of interest is the description of one patient who was relieved of tinnitus by the ligation of the right internal carotid. There was at the same time double choked disk and the diagnosis was made of an intracranial aneurism.

BOENNINGHAUS.

230. KUTSCHER. *On examinations of the naso-pharyngeal cavity in healthy man for meningococci.*

Kutscher has observed the diplococcus four times in the discharge from the naso-pharynx of 56 persons who had not themselves suffered from epidemic cerebrospinal meningitis nor had come in contact with those affected with this disease. These could not be distinguished morphologically, culturally, nor by immunizing conditions from the true meningococcus. It therefore seems that healthy persons who have received the true meningococcus from a meningitis patient may continue to carry this organism about with them, and that these persons suffer from a meningococcal pharyngitis but not true meningitis because the necessary disposition is wanting. A description of the very delicate methods which are necessary to show the presence of the meningococcus and its differentiation from similar cocci must be read in the original. NOLTENIUS.

231. KRIEGER. *Pain in the ear and in the mastoid process in hysterical subjects.*

Krieger confirms, with the aid of five additional cases, the view that the disease called mastoid neuralgia by Schwartz is of hysterical nature.

SUCKSTORFF.

232. CELIO. *Reflex cough in teething children. A contribution to the physiology of sleep.*

Children who are teething frequently wake up suddenly

with a cough after having slept soundly for three hours. The cause, according to the author, lies in the abundant production of acid-reacting mucus. This gravitates to the epiglottis and the larynx. He recommends astringent solutions to cleanse the mouth and react on the acid.

WANNER.

C.—METHODS OF EXAMINATION AND TREATMENT.

233. HAMMOND. A modification of the incision for exposing the mastoid bone. *Medical Record*, June 2, 1906.

234. HUBBY. The clinical value of the blood examinations in otitis media purulenta and its complications. *Laryngoscope*, August, 1906.

235. BRYANT. Functional derangement of the ears and upper air-tract in the insane. *Medical Record* August, 25, 1906.

236. MORSÄK. Examination of the hearing of the healthy and diseased ear by the voice. *A. f. O.*, vol. lxviii., pp. 100-121, pp. 161-208, vol. lxix., pp. 1-26.

237. BÁRÁNY. Investigations on rhythmic nystagmus reflexly caused by the vestibular apparatus. *M. f. O.*, 1906, No. 4, p. 193.

238. WARNECKE. Simple and vibratory catheterization with a current of carbonic acid gas. *A. f. O.*, vol. lxviii., pp. 227-232.

239. HAUG. On the use of novocain in operations on the ear. *A. f. O.* vol. lxix., pp. 27-43.

240. RACINE and MUCK. A case of apparently one-sided deafness after injury to the health. *Ärzt. Sachverständigen-Zeitung*, No. 18, 1906.

241. THEIMER. New experiences with tonogen. *Österreichische Ärzte-Zeitung*, No. 15, 1906.

242. LERMOYEZ. Tinnitus aurium. *La presse oto-laryngologique Belge*, 1906, 7.

243. URBANTSCHITSCH. Methodic hearing exercises. *M. f. O.* 1906, No. 3, p. 129.

244. RUPRECHT. Alypin and novocain. *M. f. O.*, 1906, No. 6, p. 399.

245. KATZ. On local anæsthesia of the upper respiratory organs and of the ear. *Deutsche med. Wochenschr.*, No. 36, 1906.

246. LAUB. On the action of certain ketone bases allied to adrenalin in rhinology. *Wiener. med. Wochenschr.*, 1906.

247. TOUBERT. Chlorid of calcium to prevent hemorrhage. *Arch. internat. d'otol.*, etc., vol. xxii., No. 1, 1906.

248. RUTTIN. A snare for the nose and ear. *M. f. O.*, 1906, No. 6, p. 464.

249. BUCHER. Inhalation of sodium phenylpropiolat after Bulling. *M. f. O.*, 1906, No. 5, p. 350.

233. HAMMOND. *A modification of the incision for exposing the mastoid bone.*

The incision is triangular instead of being straight or slightly semicircular, and begins about one half-inch back of the superior post-auricular attachment extending through all the tissues obliquely backward and downward along the hairy margin, to a point just below the middle of the posterior border. From this point it is carried forward and downward to the posterior border of the digastric fossa. (It does not appear to have the advantages of the T incision so widely practised by aural surgeons in New York City.)

CLEMENS.

234. HUBBY. *The clinical value of the blood examinations in otitis media purulenta and its complications.*

The value of the blood examination in suppurative diseases of the ear lies in the leucocyte count, simple and differential. Repeated examinations are necessary to determine the progress of the process. Clinical symptoms must be given greater weight than the mere leucocyte determination. In deep suppurations blood tests are invaluable. The average percentage in six mastoids coming to operation at the Manhattan Eye and Ear Hospital where the percentage count was made did not reach above 80.08 per cent. The lowest was 64 per cent. in an acute case.

CLEMENS.

235. BRYANT. *Functional derangement of the ears and upper air-tract in the insane.*

The observations were undertaken to show what relation there might be between insanity and functional derangement of the ear and upper air-tract. One hundred and sixty-one patients were examined. Among these, 15 had no ear disease, and only 3 had perfectly normal hearing. Although the number of cases observed is not large enough to prove any point conclusively, they nevertheless show that naso-pharyngeal or aural diseases are much more prevalent among the insane than among normal individuals; that sometimes hallucinations of hearing appear to be excited by subjective sensations of hearing, and that aprosectic psychosis is sometimes aggravated, if not excited, by intranasal pressure. The improvement among the 161 cases due to oto-rhinological

treatment was only 3.7 per cent. Out of the selected cases, about 62 per cent. showed marked improvement, and the balance showed some.

CLEMENS.

236. MORSÄK. *Examination of the hearing of the healthy and diseased ear by the voice.*

This paper, originating in Bezold's clinic, examines which numbers are heard best in the various diseases of the human ear.

In the introduction is given the examination of normal-hearing soldiers to determine the hearing distance at which certain numbers pronounced in a whisper can be perceived distinctly. This examination took place in a room 89cm long. It was found that whisper can be heard by the normal ear at a very much greater distance than has previously been assumed. The average hearing distance is 58cm, although in some cases the limit extended to 89cm. The number 7 (these numbers are all pronounced in German) was heard best, and the number 100 was heard the poorest. The numbers 7, 4, 8, 2, 6, 3, have the largest hearing distance, the numbers 9, 5, and 100 the shortest. In the tone series the numbers 2, 6, 7, are situated in the upper part, 8 and 3 in the middle, 9 and 100 in the lower, 4 and 5, as well in the upper as in the lower parts. The numbers which can be heard at long distances correspond to those which are situated high up in the tone series or extend partly into the upper part of the tone series, as 3 and 4; and the numbers with shortened hearing distance are those which belong to the lowest segment of the tone series, as 5 or 8. The numbers 4 and 5 occupy a double position.

The examination of diseases of the sound-conducting apparatus gave the following results:

1. In all disturbances in the sound-conducting apparatus the numbers 5, 8, and 9 and partly the number 4 are relatively poorly perceived.

2. Reduced perception of the number 9 points to a disturbance in the equilibrium of the ossicular chain. This number is, therefore, the characteristic number for a tubal process.

3. The number 5 in the same series is the characteristic

number for an acute middle-ear process, and poor hearing of this number indicates accumulation of fluid in the middle ear and the corresponding interference in motility of the ossicular chain.

4. Imperfect hearing of the number 8 is probably a sign of abnormal fixation of the sound-conducting apparatus. It is characteristic for chronic purulent otitis and for sclerosis.

5. In all diseases associated with the disturbance of the sound-conducting apparatus most cases present a hearing distance of below 1 metre.

6. A direct relation between the degree of sound-conducting disturbance and of the size of the hearing defect exists in sclerosis and in chronic purulent otitis. In sclerosis the hearing distance diminishes together with a retraction of the lower tone limit. In chronic purulent otitis the size of the hearing defect increases together with the destruction of the drum and of the ossicles.

7. Only in high-grade retraction of the upper tone limit (Edelmann-Galton from 6), there is a correspondence with the hearing distance.

8. Between the upper and lower tone limits there is no relation.

9. The hearing is most affected in the tubercular otitis.

10. The residua of healed perforations showed better hearing than those with persistent perforation.

11. Lesions and changes of the drum membrane are of less influence on the hearing distance than lesions of the ossicular chain.

The following varieties of disease of the nervous apparatus have been examined: Nervous deafness without apparent cause, after noises, after traumatism, following noisy occupations, after meningitis, after acquired syphilis, after congenital syphilis, Ménière's symptom complex and congenital deafness.

The results are:

1. In the chronic nervous deafness the numbers 4, 5, 7, especially the last, are heard the worst of all numbers on examination with the whispered voice.

2. The poor hearing for these numbers may be of some pathognomonic importance.

3. Marked hearing defect for the number 9 in chronic

nervous deafness without change in the drum membrane means that the present condition of the inner ear has been preceded by Ménière's symptom complex.

4. Markedly reduced hearing for the number 6 in addition to simultaneously impaired hearing for the number 7 means that the nervous deafness is acquired.

5. The hearing distance in all forms of nervous deafness is usually reduced under 50cm. An exception is the nervous deafness after noises and Ménière's disease.

6. The most marked degree of poor hearing is found in the cases depending upon congenital and acquired syphilis.

7. The upper tone limit in all forms of nervous deafness is contracted to a moderate degree (up to Edelmann-Galton 4); rarely to a more marked contraction (6).

8. The lower tone limit is always normal; in certain cases it is moderately, never markedly, contracted. It is especially involved in congenital syphilis, in Ménière's disease and in congenital deafness.

9. Between the position of the upper tone limit and hearing duration there is no connection unless the contraction is below 6.

10. After Ménière's disease the hearing distance is usually slightly reduced; an improvement on more marked contraction is not excluded.

ZARNIKO.

237. BÁRÁNY. *Investigations on rhythmic nystagmus reflexly caused by the vestibular apparatus.*

This paper of Bárány's is the most exhaustive which has appeared on this subject. There are a large number of new and interesting observations on normal and diseased ears which require to be read in the original. The results which are given at the end of the paper are as follows: on suppressing the nystagmus when the eyes are closed the sensation of apparent rotation of the body is prevented, so that the nystagmus forms a distinct part in the production of the sensation of rotation. The subjective sensations of vertigo are only of restricted value in the examination of the function of the semicircular canal. Vestibular vertigo can only be assumed to be present if definite statements are given that the apparent rotation of the external objects or of the body

itself continues for a long period. There are attacks of vestibular nystagmus when the apparent movements do not appear. The author regards rhythmic nystagmus as the measure of the amount of the irritation of the semicircular canals. It is therefore of great importance because the movements are not influenced by the will. In addition to the examination for the presence or absence of spontaneous nystagmus, it is of importance to examine the causation of the nystagmus, by the various methods of irritation and the observation of its course. The author has added another method, namely, syringing the ear with cold and hot water, to those previously known, which consist in active and passive rotation, galvanization and compression or rarefaction of the air in the auditory canal. These methods of examination have principally given us the result for the diagnosis of one-sided reduction or suppression of the function of the vestibular apparatus, especially in the diagnosis of labyrinth suppurations. The marked reactive movements which result after strong irritation of the vestibular apparatus are, in the author's opinion, only applicable for the diagnosis of the diseases of the vestibular apparatus when there is a correspondence between the degree and direction of the nystagmus and the direction and degree of the disturbance of equilibrium and when changes in the position of the head disturb in a typical manner the equilibrium. WITTMACK.

238. WARNECKE. *Simple and vibratory catheterization with a current of carbonic acid gas.*

In this apparatus the carbonic acid gas is led through a rubber tube to the aural catheter. A frequently interrupted current is more active than a continuous one, and the carbonic acid gas seems to be more potent than the other varieties of gases. There seems to be no danger of superpressure in this apparatus. ZARNIKO.

239. HAUG. *On the use of novocain in operations on the ear.*

The author has used, with apparent success, novocain solutions in a variety of aural operations. In the operations on the auricle and the bones of the mastoid, Braun's second

novocain suprarenin solution was injected subcutaneously. In operations on the drum and the middle ear a watery solution was instilled into the meatus with or without the previous application of a carbolic acid glycerin solution. Sometimes the novocain solution was added directly to the carbolic glycerin solution. Occasionally the conducting anæsthesia was employed by injection in the course of the sensory nerves (*Braun, von Eicken*) to produce complete anæsthesia of the drum. For the pain of an acute otitis the instillation of a novocain carbolic glycerin solution seemed to be the best, and the injection of Braun's solution number 2 through the tube to relieve tinnitus.

ZARNIKO.

240. RACINE and MUCK. *A case of apparently one-sided deafness after injury to the head.*

A very interesting and remarkable case of a school-girl, 12 years of age, who, after receiving a blow on the ear, became deaf; and a physician stated that the hearing power was permanently lost. The successful proof of simulation with Coggie's test saved the teacher from a severe fine. BRUEHL.

241. THEIMER. *New experiences with tonogen.*

The action of tonogen is double; in an operative way as blood saving, and as a diagnostic aid, especially in children when an examination of the naso-pharynx is much facilitated.

WANNER.

242. LERMONEYZ. *Tinnitus aurium.*

Lermoneyz treated a man seventy-six years of age for a very annoying subjective tinnitus, who had had previously no trouble with his ears. The noise was probably the result of a spasm of the elevator of the soft palate. The treatment consisted in complete withdrawal of salt from the diet. The tinnitus had existed for eight months and could be compared to the noise of parchment paper. Together with the noise there were small oscillations visible in the posterior palatal arch on the same side. Without local treatment the noise was relieved on the following day after the beginning of the diet without salt and was entirely relieved five days later. As the patient showed signs of arterial sclerosis and there were traces of albumen in the urine, the muscular cramp was

regarded as a symptom of intoxication, and this explains the striking success of the treatment. BRANDT.

243. URBANTSCHITSCH. *Methodic hearing exercises.*

Urbantschitsch replies to criticisms of his methodic hearing exercises. He again draws attention to the good results which have been obtained by his method in the Vienna Deaf-Mute Institution—of course only in particular selected pupils. WITTMACK.

244. RUPRECHT. *Alypin and novocain.*

Report of a comparison between these two anæsthetics and with cocain. Novocain is decidedly less irritating than alypin, but it is too weak to act as an anæsthetic for the mucous membrane. In conjunction with suprarenin it is an ideal anæsthetic for infiltration anæsthesia. Alypin combined with suprarenin is a substitute for cocain in its anæsthetic action. Alypin is better than cocain because there seems to be an idiosyncrasy, its toxicity is less, atonic after bleedings is less pronounced, the solution can be boiled, and it is less expensive. It does not, however, cause the cavernous structures to contract, nor the blood-vessels, and there seems to be a somewhat more marked irritation of the nasal mucosa. Solutions of alypin keep as well as those of cocain.

WITTMACK.

245. KATZ. *On local anæsthesia of the upper respiratory organs.*

Katz has given up cocain on account of its toxicity, and because it cannot be sterilized, and employs alypin and novocain. Alypin, he thinks, is the more powerful anæsthetic, as, for instance, in paracentesis of the drum and incision of a furuncle. If an anæmia of the operative field is desired, a few drops of an adrenalin solution are added to the novocain.

NOLTENIUS.

246. LAUB. *On the action of certain ketone bases allied to adrenalin in rhinology.*

Aminoketon, methyl, and ethylaminoketon were tried in 300 cases. The ethyl combination appears to be the most potent. Four to five per cent. watery solutions are used, to

which are added a few drops of a diluted hydrochloric acid solution and three per cent. boric acid solution.

All three ketones are vascular constrictors; the mucous membrane becomes pale, anæmic, and grayish white. After three to four hours this striking action is still present. The actions were tried not only for diagnostic purposes but also in order to relieve the reflex neurosis caused by the hyperæmia of the nasal mucosa and in headache and in acute catarrhs of the frontal sinuses.

The four to five per cent. solutions of the ketones are about as active as the usual solutions of the adrenalin. For diagnostic purposes, a solution of one to two per cent. is sufficient.

WANNER.

247. TOUBERT. *Chlorid of calcium to prevent hemorrhage.*

Calcium chlorid increases the coagulation of the blood, and is therefore used by the author as a prophylactic against hemorrhage. Before operations on the mastoid process, for the removal of tonsils and adenoid vegetations, a solution is given the patient to drink which contains two to three grams of chlorid of calcium. This is drunk two or three times, the last dose being taken a few hours before operation. When the solution is prescribed no milk must be drunk, because the coagulation of milk would interfere with the action of the calcium chlorid. The author underestimates the value of hydrogen peroxid, and especially of the adrenalin preparation.

OPPIKOFER.

248. RUTTIN. *A snare for the nose and ear.*

The advantage of this new snare is that it can be introduced into the nasal cavity or into the naso-pharynx and then be enlarged to any desired size. At the same time the snare will then assume the curve which has been given to it before the operation. (To be obtained from Erhard, Vienna.)

WITTMACK.

249. BUCHER. *Inhalation of sodium phenylpropiolat after Bulling.*

A solution of 200 g. was daily inhaled, at first one per cent., after two weeks increasing from two to three per cent. The temperature of the sodium was begun at 30°, gradually rising

to 45° and then finally reducing to 30°. The observations were exclusively made on tuberculous larynxes. It was attempted to make the daily inhalations as long as possible and without interruption. The results were favorable and confirm the previous experience that phenylpropiolat as an inhalation is the equal of any known remedy. WITTMACK.

d—DEAFMUTISM.

250. CITELLI. A rare case of deafmutism after purpura hæmorrhagica. *Archivio italiano di otol.*, etc., vol. xvii., 4, 1906.

A child two years of age presented, with moderate fever, the signs of purpura hæmorrhagica and paralysis of the lower extremities, this paralysis being due to an anterior poliomyelitis. The child became totally deaf at the same time. The loss of hearing continued and the child was also mute. According to the author, cases of total deafness after purpura hæmorrhagica are very unusual. RIMINI.

EXTERNAL EAR

251. DENCHFIELD. Etiology, diagnosis, and treatment of auricular chondritis and perichondritis. *Laryngoscope*, August, 1906.

252. PAWLOW-SSILWANSKI. On serous cysts of the auricle. *Chirurgija*, March, 1906.

253. TAUBERT. Acquired complete occlusion of the external auditory canal. *Deutsch. militär. Zeitschr.*, No. 6, 1906.

254. BJALIK. Two cases of burns of the drum membrane. *Eshemesjatschnik uschnych, gorlowych i nossowych bolesnej*, August, 1906.

255. GUÉRIN. Burning of the drum through hot water. *Annales des mal. de l'oreille*, January, 1906.

256. BELOGOLOWOW. On the use of the egg membrane to heal perforations of the drum. *Eshemesjatschnik uschnych, gorlowych i nossowych bolesnej*, August, 1906.

257. PUTSCHKOWSKI. Trichloracetic acid in dry perforations of the drum. *Wojenno-Medizinski Shurnal*, July, 1906.

258. ZYTOWITSCH. On respiratory and pulsatory movements of the drum. *Russki Wratsch*, 1906, No. 23.

251. DENCHFIELD. *Etiology, diagnosis, and treatment of auricular chondritis and perichondritis.*

The following treatment is recommended by the writer: Make a small but sufficiently large incision into the lower border of the mass; drain out the contents until the auricle

becomes naturally flat, swab out the entire inner surface with an application of carbolic acid which is pure, immediately following it with a swab of alcohol of the same strength, leave within the opening a small strip of gauze for drainage, and wrap the whole ear in cotton with a gentle even pressure over the formerly swollen part. Healing has taken place quickly and practically without any consequent deformity.

CLEMENS.

252. PAWLOW-SSILWANSKI. *On serous cysts of the auricle.*

Two cases, which were operated on and examined, of serous cysts of the auricle. In the first case the lesion was produced by frostbite. Microscopically there were degenerative changes in the cartilage. In the second case there was an othematoma after injury.

SACHER.

253. TAUBERT. *Acquired complete occlusion of the external auditory canal.*

The membranous occlusion of the external canal resulted from secondary inflammation in chronic purulent otitis.

BRUEHL.

254. BJALIK. *Two cases of burns of the drum membrane.*

In the first case the burn was the result of the instillation of oil of cajaput; in the second, from the introduction of several drops of a mixture of benzin and oil of bergamot. In both cases the severe pains were relieved on the application of a heated soda solution.

SACHER.

255. GUERIN. *Burning of the drum through hot water.*

After this burn the drum membrane was completely destroyed, but the otorrhoea finally ceased.

BOENNINGHAUS.

256. BELOGOLOWOW. *On the use of the egg membrane to heal perforations of the drum.*

The report of a successful case.

SACHER.

257. PUTSCHKOWSKI. *Trichloracetic acid in dry perforations of the drum.*

Trichloracetic acid has been employed in 35 cases.

(1) In the case of small and medium-sized perforations the acid gives good results. Large perforations with callous

margins are difficult to heal. The cauterization should not be tried until the inflammatory symptoms have all disappeared and the suppuration has ceased. (2) The fluid should be applied in a 30-35 per cent. solution. One should attempt not to come in contact with the mucous membrane of the tympanum. If inflammatory symptoms appear, the cauterization must be given up. (3) Between the cauterizations there should be an antiseptic irrigation and a dry packing should be introduced. (4) The general condition of the patient must not be neglected. SACHER.

258. ZYTOWITSCH. *On respiratory and pulsatory movements of the drum.*

The author found: (1) Every inspiration produces a movement of the drum. (2) The movement inward depends upon the variation in pressure between the naso-pharynx and the middle ear; also it is partly due to aspirations of the respiratory current. (3) The movement outward is caused by compression of the Eustachian tube, by the muscles which elevate the soft palate, and by the forcing out of the air from the tube into the tympanum. (4) Respiratory and pulsatory movements of the drum are measured by the movements of a drop in the manometer. (5) Occasionally the increased pulsation of the drum is the only symptom of a hyperæmia of the ear. SACHER.

MIDDLE EAR.

a.—ACUTE OTITIS.

259. RUSS. A case of primary acute purulent otitis caused by Friedländer's bacillus. *Wien. med. Wochenschr.*, No. 35, 1906.

260. BAAR. A contribution to the etiology of otitis media acuta suppurativa post morbillos. *Medical Record*, August 18, 1906.

261. WITTMACK. On the rôle of the streptococcus mucosus in the production of acute otitis media. *Deutsche med. Wochenschr.*, No. 31, 1906.

262. TANTURRI. Anatomic and experimental investigations on the pathogenesis of acute purulent otitis. *Gazzetta internazionale di medicina*, ix., 1906.

263. BELOGOLOWOW. The best method of treatment in purulent otitis in soldiers. *Wojenno-Medisinski Shurnal*, July, 1906.

264. KUDINZEW. On early opening of the mastoid process in purulent otitis. *Chirurgija*, March, 1906.

265. LUC. On latent purulent mastoiditis. *La presse otolaryngologique Belge*, 5, 1906.
266. JACQUES. On Gradenigo's symptom. *Ann. des mal. de l'oreille*, etc., June, 1906.
267. BAUROWICZ. Otitic paralysis of the abducent nerve. *M. f. O.*, 1906, No. 8.
268. TERSON. Paralysis of the abducent nerve in the course of acute otitis. *Ann. des mal. de l'oreille*, etc., July, 1906.
269. ALT. Otitic paralysis of the abducent nerve. *M. f. O.*, 1906, No. 2.
270. NEUMANN. Otitic paralysis of the facial nerve. *Wiener med. Wochenschr.*, Nos. 25, 26, 27, 1906.
271. FLEISCHMANN. On the treatment of purulent otitis with Bier's method of congestive hyperæmia. *M. f. O.*, 1906, No. 5.
272. ISEMER. Clinical experience with congestive hyperæmia in the treatment of otitis media. *A. f. O.*, lxi, pp. 131-148.
273. HASSLAUER. Congestive hyperæmia in the treatment of purulent otitis. *Münchn. med. Wochenschr.*, 1906, No. 34.
274. BAR. A case of mastoiditis without otorrhœa. *Ann. des mal. de l'oreille*, etc., May, 1906.
275. GUISEZ. Osteomyelitis of the flat bones of the skull in the course of purulent otitis and frontal sinusitis. *Ann. des mal. de l'oreille*, etc., June, 1906.

259. RUSS. *A case of primary acute purulent otitis, caused by Friedländer's bacillus.*

Two months before the onset of a subperiosteal abscess the patient experienced tinnitus and loss of hearing. Seven weeks before there was discharge from the ear, which lasted for two days. There never was any pain.

Bacteriological examination of the pus from the subperiosteal abscess revealed Friedländer's bacillus in pure culture. In the blood serum of the patient during the course of the disease, agglutinins appeared which could be demonstrated by the presence of a typical reaction. WANNER.

260. BAAR. *A contribution to the etiology of otitis media acuta suppurativa post morbillos.*

The history of five children in the same family, who were attacked with measles, is reported. In all of them appeared an acute otitis media. In three of the children the mastoid process, the antrum, and the cranial cavity had to be opened on account of alarming cerebral symptoms which appeared in spite of the previous most painstaking antiphlogistic and antiseptic treatment, poultices, and drainage after careful

irrigations of the external auditory canal with warm solution of borax or instillations with peroxide of hydrogen and drying. The appearance of this purulent inflammation of the middle ear at the end of the second week of illness, seems to speak very much against the universal view, according to which the measles otitides are caused by the primary exanthem. The fact that in the pus taken from the depth of the exterior auditory meatus as well as in the pus taken under aseptic precautions during the operation from the antrum, mastoid process, and extradural abscess, was found the same coccus—a staphylococcus—shows the latter to be the cause of the disease.

CLEMENS.

261. WITTMACK. *On the rôle of the streptococcus mucosus in the production of acute otitis media.*

Wittmaack has examined the discharge bacteriologically obtained from a large number of cases of severe acute otitis with mastoiditis, and has used the blood agar media of Schottmueller and lackmus-nutrose agar. In addition to the already well-known pyogenic organisms, he found the streptococcus of erysipelas-Schottmueller and the diplococcus lanceolatus. The streptococcus mucosus occupied the third place in the production of acute otitis. Staphylococci were only found when the discharge had been present for several days. It therefore seems reasonable to say that the staphylococci are due to a secondary infection, while the green streptococcus described by Schottmueller apparently is not of any particular importance in the severe forms of acute otitis. To differentiate the three above mentioned varieties of cocci, Wittmaack employed staining methods with thionin. If the cocci were usually in pairs, with the characteristic lance shape and partly intracellular, and, upon staining with carbol-fuchsin, presented distinct capsules, which capsules did not appear with thionin staining, they were with great probability the diplococcus lanceolatus. If there were distinct red-colored capsules after staining with thionin, the organism was probably the mucosus. When all capsule formation was absent and the cocci were arranged in chains, probably the streptococcus of erysipelas was present. The author, moreover, formed the belief that the otitis mucosus runs a protracted course rela-

tively, often complicated with mastoiditis. He believes that in many cases a primary disease of the mucous membrane in the pneumatic cells is present, while the involvement of the bone and the mastoid process is to be regarded as a secondary process.

NOLTENIUS.

262. TANTURRI. *Anatomic and experimental investigations on the pathogenesis of acute purulent otitis.*

After a number of anatomic and histologic points on the middle ear, the author discusses the bacteriological condition of the Eustachian tube and the middle ear in health. Moreover the various causes which lead to occlusion of the Eustachian tube are mentioned, which, in the opinion of the author, is an important factor in the causation of acute purulent otitis.

In confirmation of this, the author experimented with rabbits, with the following result:

The experimental transformation of the open cavity of the middle ear into a closed cavity always causes an acute purulent otitis.

RIMINI.

263. BELOGOLOWOW. *The best method of treatment in purulent otitis in soldiers.*

After careful drying of the canal and the drum, the latter receives an application of a heated one per cent. silver-nitrate solution. A small cotton tampon is then introduced to the drum in the form of a thin layer. This is supposed to immobilize the drum. The canal is then filled with small pledgets of cotton and the dressing is changed daily. The results are supposed to be very good.

SACHER.

264. KUDINZEW. *On early opening of the mastoid process in purulent otitis.*

The author advocates early operation, even when no distinct signs of mastoiditis are present and there is only a suspicion of mastoiditis. Of diagnostic importance is the dulness on percussion of the mastoid process.

SACHER.

265. LUC. *On latent purulent mastoiditis.*

If a person suffers from bilateral purulent otitis with so much discharge that an involvement of the mastoid process is suspected, signs of retention of pus in one ear should mean

that both antra are to be opened at one sitting. We thus prevent a second retention of pus, which would necessitate a second narcosis, and we thus abbreviate the suppuration in both ears. The treatment is thereby also simplified. Two cases are reported which have been treated in this manner.

BRANDT.

266. JACQUES. *On Gradenigo's symptom.*

Of the cases of paralysis of the abducent nerve in the course of an otitis media, in 19 this symptom appeared in the otherwise normal course of the otitis and was spontaneously recovered from. In three it was the initial symptom of fatal meningitis. The author publishes a fourth case of this kind, which was also remarkable inasmuch as one day a large quantity of cerebrospinal fluid was evacuated from the ear. The somewhat retarded operation did not demonstrate the path by which the fluid was discharged. No autopsy.

BOENNINGHAUS.

267. BAUROWICZ. *Otitic paralysis of the abducent nerve.*

An acute perforative otitis media which ran a brief course but was complicated with paralysis of the sixth and seventh nerves, which was also rapidly recovered from.

WITTMACK

268. TERSON. *Paralysis of the abducent nerve in the course of acute otitis.*

In both cases abducent paralysis occurred in children as the only complicating symptom of an acute purulent otitis. This paralysis was recovered from several months after the otitis had healed. It is interesting to observe that the authors in the course of their study have come to a plausible explanation of this fact. According to them, it is due to the progression of the inflammation from the tympanum along the venous plexus surrounding the carotid canal, which enters into the cavernous sinus and there comes in close proximity with the abducent nerve. It is impossible to say whether there is an inflammatory affection of these nerves or of the lymph space or of a sympathetic nerve. This hypothesis gains ground because in one of these cases, 15 months before, a transient facial paralysis occurred on the same side after

an acute purulent otitis. In facial paralysis there is a direct extension of the inflammation of the tympanum to the nerve.

BOENNINGHAUS.

269. ALT. *Otitic paralysis of the abducent nerve.*

Alt has studied the various cases of otitic paralysis of the abducent nerve reported in literature. He found that the most frequent cause for the production of this paralysis was a meningitis situated at the apex of the petrous pyramid. Another cause was pressure from a serous meningitis in extradural abscesses. The progression of the inflammation in the venous sinus of the carotid canal to the cavernous sinus and to the abducent nerve is very probable, while thus far no proof has been furnished for the exemption of an infectious neuritis of this nerve.

WITTMACK.

270. NEUMANN. *Otitic paralysis of the facial nerve.*

The author reports on a case of facial paralysis after the administration of iodine, and believes it to have been caused by inflammatory hyperæmia and serous imbibition of the neurilemma and of the endosteal lining of the facial canal.

The author gives a valuable point to avoid operative injury to the facial nerve. This is the occurrence of arterial bleeding during the removal of the facial ridge, which is supposed to be derived from a branch situated near the canal.

Finally the indications for the anastomoses of the facial, according to Alexander, and the operative technique are given. The symptoms and the literature, as well as the pathological changes, complete this very readable paper.

WANNER.

271. FLEISCHMANN. *On the treatment of purulent otitis with Bier's method of congestive hyperæmia.*

Twenty-four patients were treated with congestive hyperæmia. Of these there were nine purulent otitides without complications, twelve with mastoiditis, two of chronic purulent otitis with acute mastoiditis, two of perichondritis.

The results were not very favorable. During this delay the process in the mastoid frequently extends to the dura or to the sinus. This in itself is a grave objection to the new method, and the danger is apt to be present that we overlook

the timely moment for the operation. The congestive hyperæmia removes the acute symptoms from the picture of the disease and converts the manifest into a latent variety. It is surely true that not all cases of mastoiditis will be cured by congestive hyperæmia and, as long as we do not know which are particularly applicable to this method and how long we may wait with the operation, we must be content that in addition to good results there will also be some unsatisfactory terminations.

WITTMACK.

272. ISEMER. *Clinical experience with congestive hyperæmia in the treatment of otitis media.*

Based on 12 cases of purulent otitis (11 acute, 1 chronic; 9 with mastoiditis) which were treated at the Halle Clinic, with congestive hyperæmia, the author comes to practically the same conclusions as Fleischmann, which are most unfavorable to the method:

1. The treatment of otitis media with congestive hyperæmia is not without danger because we are liable to overlook the timely operation and thus increase the danger of the disease.

2. It cannot as yet be established in which cases and in what stage congestive hyperæmia is applicable, nor how long it is to be continued before operative treatment should be tried.

3. Especially dangerous is the protracted use of congestive hyperæmia in the otitis due to diplococci.

4. Congestive hyperæmia should of course not be tried in the presence of any intracranial complication.

ZARNIKO.

273. HASSLAUER. *Congestive hyperæmia in the treatment of purulent otitis.*

Hasslauer has treated fourteen cases of chronic otitis and twenty-three cases of acute otitis with Bier's method. In the chronic cases, with the exception of one, no favorable influence could be observed, while the ordinary treatment resulted in recovery.

Of the twenty-three cases of acute otitis, sixteen were without perforation; of these seven apparently got well from congestive hyperæmia, in the other nine paracentesis had been performed. Three of the latter had to be operated

upon later. The other seven cases came to treatment with an already existing perforation. Of these, three recovered without, and four with, opening of the mastoid process. In some of the cases operated upon the suction treatment of Stenger was applied.

It was noticeable that in the treatment with congestive hyperæmia external otitis frequently appeared.

The author is very well satisfied with the results obtained, and thinks that congestion is a distinct advance in the treatment of suppurative ears. It is well known that most authors are of the opposite opinion. The reviewer cannot regard Hasslauer's results as particularly favorable, because in 30 per cent. of the cases he had to operate, while Hummel and Mueller, who did not use this treatment, had to operate in only 14 and 7 per cent. respectively.

SCHIEBE.

274. BAR. *A case of mastoiditis without otorrhœa.*

Two years after an acute otitis media which had recovered in four weeks with closure of the drum and restitution of the ear, a subperiosteal abscess developed over the mastoid process on the same side. The mastoid process contained granulations and pus. It was remarkable that the drum was normal and that paracentesis did not evacuate any discharge, and that the hearing since the onset of the mastoiditis had become very much reduced and later was regained.

BOENNINGHAUS.

275. GUISEZ. *Osteomyelitis of the flat bones of the skull in the course of purulent otitis and frontal sinusitis.*

A clinical study of this infrequent condition which has only in recent times had attention paid to it. The clinical picture is as follows: in the course of a frontal sinusitis or a purulent otitis, usually after an operation, rarely spontaneously, a swelling and redness of the forehead, of the temple or of the occiput appear with pain and pyæmic fever. At operation a subperiosteal abscess is found. The bone is red, softened, and infiltrated with pus. The process may now cease or go on to death. A clinical example of this course is the case of Claoué, which is reviewed below.

BOENNINGHAUS.

b.—CHRONIC PURULENT OTITIS.

276. IWANOW. Ectogan in chronic otorrhœa. *Eshemesjatschnik uschnych, gorlowych i nossowych bolesnej*, September, 1906.

277. CHRISTENSEN. On caries of the hammer and of the incus, based on fifty radical operations. *Ugeskrift for Læger*, 1906, Nos. 25, 26.

278. HAAG. Otitis media with cholesteatoma. *Korrespondenzblatt f. Schweizer Ärzte*, No. 19, 1906.

279. STELLA. Cholesteatoma of the ear. *Allgemeine Wiener med. Zeitung*, Nos. 13, 14, 15, 1906.

280. VIDAL. On the pain during after-treatment with boric acid insufflations in radical operations. *Annales des mal de l'oreille*, January, 1906.

281. LAURENS. Combined method of after-treatment in the radical operation. *Annales des mal. de l'oreille*, etc., March, 1906.

282. KRETSCHMANN. Salivary fistulæ after mastoid operations. *Arch. f. Laryngol.*, lxxviii., pp. 257-262.

283. URBANTSCHITSCH. On the pathology and physiology of the labyrinth. *M. f. O.*, 1906, No. 2, p. 1.

276. IWANOW. *Ectogan in chronic otorrhœa.*

The author has used ectogan in chronic suppurations with large or complete destruction of the drum. The powder is insufflated every two or three days. The suppuration usually has ceased after 2-4 weeks.

SACHER.

277. CHRISTENSEN. *On caries of the hammer and of the incus, based on fifty radical operations.*

Two cases are excluded, one on account of a previously undertaken operation, one on account of the presence of a carcinoma. The hammer and anvil were both present in 26 cases, the hammer alone in 8, the incus in 6; both were absent in 8.

The malleus was healthy in 13 cases, carious in 21, absent in 14. The incus was healthy in 4 cases, carious in 28, absent in 16.

The carious process was situated in the hammer: in the region of the manubrium 11 times, at the neck twice, at the head 13 times, on the articular surface only twice. The incus was affected: in the long branch, 22 times, in the short branch 12 times, the body 10 times. The bone was almost completely absent in 3 cases—the articular surface was usually not involved, only when there was marked caries or when the other bones were absent.

Generally the bony parts which are protected by connective tissue are affected the least. The caries, presumably, is secondary to the periostitis. The duration of the suppuration and the extent of the caries do not stand in any relation, though retarded discharge of pus or cholesteatomata produce marked caries.

As regards the otoscopic picture, perforation of Schrapnel's membrane usually denotes caries of the head of the hammer. If this membrane is intact, the head of the hammer is not involved. There is no correspondence between the caries of the incus and the situation of the perforation.

JOERGEN MOELLER.

278. HAAG. *Otitis media with cholesteatoma.*

This article is destined for the general practitioner. In discussing the radical operation the author recommends preservation of the ossicular chain when hearing remnants are present. Siebenmann's plastic furnishes excellent results, and if cleanly performed never leads to perichondritis.

OPPIKOFER.

279. STELLA. *Cholesteatoma of the ear.*

The author distinguishes between false cholesteatoma resulting from epithelial proliferation of the external auditory canal and primary true cholesteatoma, which is a true endothelioma. The former is very frequent, the latter very unusual. A number of theories for the production of false cholesteatoma are adduced, but the one of Habermann-Bezold is not mentioned. The view of the author that every cholesteatoma associated with purulent otitis should be radically operated upon, is not the reviewer's opinion. The after-treatment of the radical operations is carried out with boric acid insufflations, according to Eemann. On the whole, the paper does not bring anything new.

WANNER.

280. VIDAL. *On the pain during after-treatment with boric acid insufflations in radical operations.*

This otherwise excellent and simple method of Eemann's has become discredited because the boric acid in the beginning may cause severe pain. Vidal found that this originates from the tube and that it can be prevented if a drop of

glycerine is instilled in the tubal angle before the boric acid is introduced.

BOENNINGHAUS.

281. LAURENS. *Combined method of after-treatment in the radical operation.*

Gauze packings become irritating after a time. Therefore, after two weeks, daily introduction of boric acid. Very rapid epidermization, the longest period of healing six weeks. Cauterization of the granulations infrequent. The wound can be well overlooked by (1) resection of the posterior canal wall to the margin of the concha; (2) leaving the wound open until it closes itself by granulation.

BOENNINGHAUS.

282. KRETSCHMANN. *Salivary fistulæ after mastoid operations.*

This includes two observations. In a retroauricular scar a thin fistula appeared. In one case this appeared in the course of the healing, in the other case it occurred many years after healing following a slight traumatism. The fistula discharged watery thin fluid which was increased in amount during mastication. The external fistulous opening was situated at the apex of the mastoid process. The fistulous tract passed inward and upward.

The author thinks it is very likely that these are cases of parotid fistulæ. In addition to these there may be the very unusually observed lymphatic fistulæ, though anatomical considerations favor the first. A chemical analysis of the discharge could not be made. It would seem to the reviewer that after a dose of pilocarpine the differential diagnosis would have been easy. If it was a case of a parotid fistula, the discharge would have been very much increased; otherwise there would have been no increase. The fistulæ were healed by repeated cauterization with silver nitrate.

ZARNIKO.

283. URBANTSCHITSCH. *On the pathology and physiology of the labyrinth.*

This is the report of a cochlear sequestrum, which induces the author to make some observations on the hearing after the

loss of the cochlea, on the subjective auditory impressions, the relation of the facial nerve and hyperæsthesia for thermic irritation on the affected side which was present in these cases.

WITTMACK.

C.—CEREBRAL COMPLICATIONS.

284. KRÖNLEIN. Demonstration of a case of brain abscess successfully operated upon. *Korrespondenzblatt f. Schweizer Ärzte*, No. 19, 1906.

285. JACKSON. Dual acute cerebral abscess. Operation. Recovery. *N. Y. Med. Jour.*, June 23, 1906.

286. LAGOUTTE. Abscess of the brain of otitic origin. *Lyon médical*, No. 26, 1906.

287. NIELSEN. Otitic abscess of the brain. Operation. *Ugeskrift for Læger*, 1906, No. 23.

288. FOTIADE. Labyrinthine suppuration after cholesteatoma. Otitic abscess of the cerebellar peduncle. *Ann. des mal. de l'oreille*, etc., February, 1906.

289. WAGENER. On the empyema of the saccus endolymphaticus and the importance of the aqueductus vestibuli for the extension of infection. *A. f. O.*, lxxiii., pp. 273-285.

290. POLI. A case of otitic intracranial complication after trauma. *Archivio Italiano di Otologia*, etc., vol. xvii., 4, 1906.

291. HÜTTIG. Cases of endocranial complications of suppurative otitis. *A. f. O.*, lxxiii., pp. 233-251.

292. PANSE. A case of cerebellar abscess. *M. f. O.*, 1906, No. 8, p. 539.

293. FURET. Pneumococci by meningitis of otitic origin. *Ann. des mal. de l'oreille*, etc., July, 1906.

294. BARDIER and MERIEL. Mastoiditis and thrombo-phlebitis and jugular thrombosis. *Ann. des mal. de l'oreille*, etc., February, 1906.

295. ARCHIPOW. Thrombosis of the lateral sinus and of the jugular vein, with ligation of the latter. *Eshemesjatschnik uschnych, gorlowych i nossowych bolesnej*, September, 1906.

284. KRÖNLEIN. Demonstration of a case of brain abscess successfully operated upon.

Krönlein demonstrated a man forty-five years of age who had suffered from an otitic diplococcus abscess in the left temporal lobe. The operation was followed by recovery.

OPPIKOFER.

285. JACKSON. Dual acute cerebral abscess. Operation. Recovery.

Patient, aged thirty-three, had left middle-ear suppuration of ten days' duration, following earache, subsequent to a blow

on the side of the head. The usual symptoms being present, a mastoidectomy was performed and pus was found in scattered locations; the tip cells being normal. No softened bone was found in the location of the dura, yet there was some in both tegmina. Convalescence appeared to go on normally until the ninth day, when the case had convulsions and became unconscious. Examination of the eye grounds was made and found normal. Marked optic aphasia developed. Unmistakable dulness on percussion was observed over the left side; the pulse was slow in proportion to the temperature, and continuous pain was located in the frontal region. At the second operation, the opening was made in the parieto-temporal region, and forward, downward, and inward for about 2cm an uncapsulated abscess was located, from which four drachms of pus escaped. After a temporary improvement, symptoms occurred demanding further cerebral investigation; and at the third operation, failing to find any communicating pus pocket, the search was pushed downward in a direction paralleled with the temporal gyri, where pus was found and evacuated. Pus from the mastoid showed diplococci in pure culture, while in that from the cerebral abscesses were streptococci.

The use of potassium iodide and biniod. of mercury was found of value in post-operative treatment, especially upon signs of recurrence of cerebral trouble. Cigarette drainage was more satisfactory than any other form heretofore used. Irrigation of the abscess cavities was not used, and the custom is deprecated by the author.

CLEMENS.

286. LAGOUTTE. *Abscess of the brain of otitic origin.*

A left-sided chronic otorrhœa was followed, in a man nineteen years of age, with tenderness over the squama, fever, somnolence, and disturbance of speech. After operating upon the mastoid process, apparent healing; then the patient became worse two weeks later. The middle cranial fossa was exposed and an abscess in the temporal lobe evacuated. Recovery.

OPPIKOFER.

287. NIELSEN. *Otitic abscess of the brain.*

A boy, eleven years of age, with bilateral chronic otitis. Severe brain symptoms for two months. Fetid otorrhœa on

the left side. At the radical operation a fistula leading into the interior of the skull was found. No improvement; retinitis and paresis of the abducent nerve; then opening of the skull. The brain tissue was somewhat discolored, but there was no abscess. Transient improvement followed by severe brain symptoms and copious discharge of cerebrospinal fluid. Death after ten days. Autopsy: the left temporal lobe is a soft mass infiltrated with pus; the ventricle is dilated into the prolapse. The other parts of the brain are normal.

JOERGEN MOELLER.

288. FOTIADÉ. *Labyrinthine suppuration after cholesteatoma. Otitic abscess of the cerebellar peduncle.*

The first case is unusual because the labyrinth, which was unquestionably diseased (Ménière, facial paralysis) was left untouched at the operation. Later, when the acute symptoms of the labyrinth disturbance had disappeared, a large granulation on the promontory was curetted and recovery took place. In the second case an abscess in the cerebellar peduncle after chronic otitis led to meningitis and death two and a half months after the beginning of the initial symptoms, and two weeks after the beginning of the manifest symptoms. The abscess was not exposed at operation.

BOENNINGHAUS.

289. WAGENER. *On the empyema of the saccus endolymphaticus, and the importance of the aqueductus vestibuli for the extension of infection.*

The author observed a case where an abscess at the posterior surface of the petrous pyramid resembled a ruptured empyema of the sac. The microscopic examination picture showed that this was a simple extradural abscess situated inside of the infected saccus endolymphaticus. Thirty-one cases of this kind, reported in literature, are then critically reviewed. The author believes that the development of an empyema of the sac and the importance of the aqueduct of the vestibule as an infectious path are entirely undetermined. Though it cannot be said that a suppuration in the labyrinth cannot extend along the aqueduct of the vestibule to the sac, the anatomic relations do not appear favorable. Careful microscopic examination alone will lead to a solution of this question.

ZARNIKO.

290. POLI. *A case of otitic intracranial complication after trauma.*

A patient, sixty-four years of age, suffering from a left-sided chronic purulent otitis, received a blow over the left temple which was followed by severe headache and a diffuse swelling of that half of the head. Marked fever and chills; left-sided facial paralysis. Shortly after the operation, death.

At autopsy, left-sided chronic purulent otitis media, abscess of the left cerebellar hemisphere, purulent leptomeningitis of the convexity and of the base of the brain.

This case is of especial interest from a judiciary standpoint, as it is of importance to determine whether, in the case of a person suffering from a suppuration, an injury to the head facilitates an endocranial complication, or, if this complication be present, its course be made more rapid by the injury. The question is answered in a positive sense. RIMINI.

291. HÜTTIG. *Cases of endocranial complications of suppurative otitis.*

1. Acute purulent otitis and mastoiditis, left sinus thrombosis, sinus operation with ligation of the jugular vein on the left side, acute purulent otitis with mastoiditis on the right side, mastoid operation on the right side, followed by recovery. Striking was the following condition in this case: During the first change of dressing, two days after the operation on the left sinus, the patient aspirated air four times through the jugular wound with a loud noise. Syncope of short duration. Recovery.

2. Chronic purulent otitis (cholesteatoma), multiple abscesses of the temporal lobe, evacuation of a large abscess, progressive purulent infiltration of the brain. Death.

3. Chronic purulent otitis on the right side (cholesteatoma), sinus thrombosis, leptomeningitis with intrameningeal accumulations of pus in the posterior cranial fossa. Operation. Death.

4. Acute purulent otitis on the right side. Mastoiditis. Cerebral abscess. Operation. Recovery. ZARNIKO.

292. PANSE. *A case of cerebellar abscess.*

The abscess was caused neither by sinus thrombosis nor by labyrinth suppuration. There was no fever. The only

symptoms were slow pulse, optic neuritis—possibly from the meningitis—vomiting, constipation, vertigo with nystagmus and staggering of gait. Preserved hearing and without tinnitus. The nystagmus was noted, especially on looking to the affected side. Favorable course. Recovery.

WITTMAACK.

293. FURET. *Pneumococcic meningitis of otitic origin.*

In a case of acute otitis of unknown origin, three weeks later death ensued in 36 hours from meningitis. Paracentesis had been done two weeks before and there was absolutely no obstruction to the escape of the discharge. In the lumbar fluid pneumococci were present.

BOENNINGHAUS.

294. BARDIER and MÉRIEL. *Mastoiditis and thrombophlebitis and jugular thrombosis.*

The sinus was exposed but not incised, notwithstanding classical pyæmic symptoms. It appeared blue, soft, and pulsating. The autopsy revealed a parietal circular thrombus extending from the torcular to the hyoid bone. It was 3-4mm thick and presented a central lumen.

BOENNINGHAUS.

295. ARCHIPOW. *Thrombosis of the lateral sinus and of the jugular vein, with ligation of the latter.*

Complete description of seven cases which had been operated upon: in three there was recovery; in four, death.

SACHER.

d.—OTHER EAR DISEASES.

296. BRYANT. The great psychical importance of ear disease. *Jour. Nervous and Mental Disease*, September, 1906.

297. FIEDLER. On the so-called blue drum membrane. *M. f. O.*, 1906, No. 2, p. 106.

298. SCHILLING. A case of stapes ankylosis with anatomic examination. *A. f. O.*, lxviii., pp. 209-222.

299. HAMMERSCHLAG. On the question of the inheritance of otosclerosis. *M. f. O.*, 1906, No. 6, p. 443.

296. BRYANT. *The great psychical importance of ear disease.*

The cases reported are interesting because of their evident

dependence on catarrhal condition of the ears, as shown by the cessation of the hallucinations when the aural conditions were corrected. The evidence points to some connection between ear disease and hallucinations of hearing other than mere coincidence. It is possible that hallucinations of hearing originate in subjective ear sensations in most cases, and that cure of the coincident ear disease cures or assists the convalescence from psychoses in a notable number of cases. Some cases of insanity appear to be excited by ear disease; and the convalescence of insane patients is delayed by the presence of ear disease. Unilateral hallucinations of hearing are unquestionably due to unilateral ear disease.

CLEMENS.

297. FIEDLER. *On the so-called blue drum membrane.*

In two cases the bluish discoloration of the drum was produced by an exudate situated in the tympanum. In the second case the exudate became infected, the drum perforated, and the exudate was discharged, whereupon the bluish discoloration disappeared.

WITTMACK.

298. SCHILLING. *A case of stapes ankylosis with anatomic examination.*

A female patient, thirty-seven years of age. Left-sided stapes ankylosis. Right purulent otitis. Radical operation. Meningitis. Death. The autopsy showed that the suppuration gained access to the labyrinth through the round window, and then to the interior of the skull. Microscopic examination of both ears. The areas of rarefaction were shown in the sclerosed ears. Clinical remarks.

ZARNIKO.

299. HAMMERSCHLAG. *On the question of the inheritance of otosclerosis.*

Report of two family trees of patients suffering from otosclerosis, which clearly shows the appearance of this disease in certain families. Thereupon the author advances a number of critical and theoretical observations on the nature of this trouble and upon what the inheritance depends.

WITTMACK.

NERVOUS APPARATUS.

300. STEIN. On sudden disturbances in the auditory nerves. *M. f. O.*, 1906, No. 1.
301. ALEXANDER. Labyrinthitis chronica ossificans. *M. f. O.*, 1906, No. 7.
302. ALEXANDER. On progressive deafness from atrophy of Corti's organ. *A. f. O.*, pp. 95-105, 1 table.
303. SELIGMANN. Progressive nervous deafness and Edinger's theory on the consumptive diseases of the nervous system. *M. f. O.*, No. 2, p. 109, 1906.
304. URBANTSCHITSCH. Ménière's symptom-complex after mumps in hereditary deafmutism. *Wien. med. Wochenschr.*, No. 26, 1906.
305. MOLL. Hysterical deafness. *Allgemeine Wien. med. Zeitung*, Nos. 32 and 33, 1906.
306. ESKAT. Arterial sclerosis of the labyrinth and of the auditory centres. *Ann. des mal. de l'oreille*, etc., April, 1906.
307. LANNOIS. Combined syphilitic paralysis of the facial and auditory nerves. *Ann. des mal. de l'oreille*, etc., September, 1906.
308. ALT. On deafness for melodies and musical false hearing. Leipzig and Wien: Franz Deuticke, 1906.

300. STEIN. *On sudden disturbances in the auditory nerves.*

The author endeavors to explain the sudden onset of hearing disturbances in the nervous apparatus by the associated arterial sclerosis. Six cases are added, in which disturbances of hearing and subjective auditory perceptions are symptoms of a latent arterial sclerosis which became manifest in excitement or from injury. The disturbances are supposed to be the result of a diminution of the elasticity of the vascular walls after a prolonged vascular spasm.

WITTMAACK.

301. ALEXANDER. *Labyrinthitis chronica ossificans.*

Under this name Alexander describes a pathological condition which he found in a case of acquired deafness. There were circumscribed thickening and ossification of the vestibular membrane and in the papilla basilaris. In addition there was marked atrophy of all the branches of the auditory nerve, with complete degeneration of all the nerve terminals in the labyrinth. Contraction of the entrance of the scala vestibuli into the vestibule. Formation of coagulum in the peri- and endo-lymphatic spaces. Septa and connective-tissue bridges in the vestibule, especially in the basal portion of the tympanic

scala, and atrophy of the stria vascularis. Anatomically this is a disease of the internal ear, which can be best described as a chronic non-purulent inflammation producing bone in the labyrinth similar to ossification after chronic periostitis in other parts of the body. The etiology was not very clear. There was no exact examination made of the ears during life.

WITTMACK.

302. ALEXANDER. *On progressive deafness from atrophy of Corti's organ.*

This patient, sixty-three years of age, died from a nervous lesion, possibly due to syphilis (clinical diagnosis: myelitic and encephalitic foci. At autopsy: chronic internal hydrocephalus; chronic oedema of the brain; clouding of the ependyma of the fourth ventricle). Moreover, there was left-sided deafness depending upon disease of the sound-perceiving apparatus. Moderate tubal catarrh.

Microscopic examination. Right: 1. Degenerative atrophy of Corti's organ. 2. Atrophy of the stria vascularis. 3. Degeneration of the spiral ligament. 4. Anæmia of the cochlea. 5. Arterial sclerosis of the cochlear vessels. 6. Increased pigmentation of the cochlea. The upper part is unchanged. Left: 1. Complete defect of the papilla basilaris. 2. Marked atrophy of the spiral ligament and of the spiral cord. 3. Parietal connective-tissue formation in the scalæ. 4. Moderate atrophy of the cochlear nerve and of the spiral ganglion. The upper part normal.

This case is the first one in which an atrophy of Corti's organ without other changes has been demonstrated. It is not possible to say how much arterial sclerosis or syphilis were causative factors.

ZARNIKO.

303. SELIGMANN. *Progressive nervous deafness and Edinger's theory on the consumptive diseases of the nervous system.*

Seligmann is of the opinion that progressing, increasing disease of the auditory nerve is due to a consumption of the nerves, in the sense of Edinger. He believes that by the prevention of auditory impressions by closing the ear with cotton, the use of antiphones and the non-use of hearing tubes may be recommended in treatment.

WITTMACK.

304. URBANTSCHITSCH. *Ménière's symptom-complex after mumps in hereditary deafmutism.*

A child, twelve years of age, whose parents and brother were deaf-mutes, suffered from earliest childhood from continuous tinnitus and vertigo for two years, and after an attack of mumps suffered from Ménière's symptoms two weeks later. The attacks, lasting about 10-15 minutes, occurred at first three or four times a month, later, twice a week. The child also demonstrated retinitis pigmentosa, nystagmus, and ataxic disturbances of the lower extremities. An islet of hearing which had been present before the mumps later was lost. On the right side all tones are perceived.

Treatment consisted in the constant current 15-30 minutes long with the ear electrode placed in the drum. Half of the time the direction of the current was reversed. The author believes that he has obtained good results. Recently the perception for low tones in the left ear has improved.

WANNER.

305. MOLL. *Hysterical deafness.*

Report of a case where the first examination showed deafness of one ear. Suggestive treatment caused an improvement in the hearing for whisper from 1-4m. The case is regarded as one of hysteria.

WANNER.

306. ESKAT. *Arterial sclerosis of the labyrinth and of the auditory centres.*

This is an excellent clinical paper which cannot be briefly reviewed. Arterial sclerosis of the labyrinth is to be suspected if anybody beyond the forties gradually or suddenly becomes affected with nervous deafness with or without symptoms of vertigo; if middle-ear sclerosis can be excluded, and there is no sign of syphilis, tabes, progressive paralysis and nephritis; but arterial sclerosis is present in the heart and in the vessels. The paper shows knowledge of the subject, especially as concerns the acoustic and static functions of the brain, which is unusual for an otologist, though it is explained by the fact that the author was an assistant of Charcot's at the Salpêtrière. His experiences with large doses of quinine date from that same period. This drug Charcot was in the habit of employing in Ménière's disease. The description becomes

dramatic when the unfortunate condition is pictured to which the patients attain from treatment, and which frequently results in complete bilateral deafness. BOENNINGHAUS.

307. LANNOIS. *Combined syphilitic paralysis of the facial and auditory nerves.*

Isolated paralysis of the facial nerve or of the auditory nerve in syphilis is not unusual, the combined paralysis is surely very unusual. To the previously known cases Lannois adds four personally observed cases. The combined affection, as well as the isolated one, occurs frequently as an early symptom in the secondary stage of syphilis, rarely in the tertiary. The paralyses developed rapidly together, or one after another. Facial paralysis disappears on treatment, the auditory nerve paralysis cannot be cured. The seat of the combined affections is the internal auditory canal. In the early stage there is a neuritis, in the last stage, a gumma or an exostosis. BOENNINGHAUS.

308. ALT. *On deafness for melodies and musical false hearing.*

In deafness for tones, or as Alt calls it, for melodies, the simultaneously existing word-deafness has not been sufficiently taken into regard in former observations. Alt therefore demands that the aural examination should in future determine whether a peripheral ear disease is not accountable for the lack of understanding for words and melodies, especially if tone defects in the family exist between b^1 and g^2 . Deafness for melody, according to Alt, depends upon various brain diseases (areas of softening, defects, neuroglioma, etc.). The most marked disturbance of understanding for melodies is the congenital melody deafness. In most cases which have been properly examined there was deafness to a varying degree. Alt believes that the patient who is word deaf in the presence of sensory or subcortical-sensory aphasia, can under no circumstances acquire an understanding for words from the ear. If in complete deafness from disease of the ear, word perception is lost, perception for tones and noises is also completely or nearly completely lost; while in sensory or subcortical-sensory aphasia usually good perception for tones and noises exists in addition to word deafness.

In order to arrive at a better understanding of musical false hearing, regarding which the author has collected a large literature, a number of experiments have been made. Moderate depression of the drum and of the ossicles and a variation in labyrinth pressure cause a change in the tone perception. As the nerve always transmits the same impression, then if the vascular apparatus—that is, the strings of the membrana basilaris, are differently tuned, the nerve produces in a higher pitch a deeper tone, while a deeper pitch produces a higher tone. The last ground for the false hearing is situated in the labyrinth, while the primary is often a disease of the middle ear. According to Alt, neuræsthenia, hysteria, fatigue of the ear are of considerable importance. SUCKSTORFF.

NOSE AND NASO-PHARYNX.

a.—GENERAL PATHOLOGY AND TREATMENT.

309. ECKSTEIN. Injections of paraffin in nasal and facial plastic surgery. *Berl. klin. Wochenschr.*, 1906, Nos. 31, 32.
310. MENIER. Anosmia and Parkinson's disease. *Archivio italiano di otol.*, etc., vol. xvii., 5, 1906.
311. WELMINSKY. Therapeutic reports. *Arch. f. Laryng.*, vol. xviii., 3.
312. KIEFFER. The relation between tonsillitis and acute articular rheumatism, with particular reference to the prophylaxis of post-anginal rheumatism. *Am. Med.*, September, 1906.
313. MORAWECK and HALL. The use of sheet paraffin in lesions of the nose and throat. *Jour. American Medical Ass'n*, February 24, 1906.
314. DUFOUR. New and most efficacious method for removing faucial tonsils. *Virginia Medical Semi-Monthly*, December 22, 1905.
315. WILSON. Some anatomical and physiological considerations of the faucial tonsil. *Jour. American Med. Ass'n*, May 26, 1906.
316. RHODES. Treatment of sarcoma of the naso-pharynx by injections of adrenalin. *Jour. American Medical Ass'n*, August 11, 1906.
317. KERR. A new shield for use in nose and throat examinations. *Jour. Am. Med. Ass'n*, September 8, 1906.
309. ECKSTEIN. Injections of paraffin in nasal and facial plastic surgery.

The unpleasant accidents which have occurred in paraffin injections are described, such as pulmonary emboli, blindness, skin necrosis, paraffin migration. The author is convinced

that by the use of his hard paraffin, of over 50° melting point, all of these accidents can be avoided. A short description follows of the histological examination as to the future of paraffin in the living body, with the statement that paraffin of high melting point probably is not all absorbed. A marked improvement in cosmetic results has been obtained because in certain cases the paraffin is not injected but implanted. It is introduced in larger or smaller particles through a cutaneous incision, then pushed into shape with the fingers or with a pair of forceps where it is needed. The indications and technique of this procedure are described.

This paper is an exhaustive presentation of Eckstein's well-known standpoint as to the question of paraffin injections. It should be read by everybody who is interested along this line.

MUELLER.

310. MENIER. *Anosmia and Parkinson's disease.*

In three patients suffering from paralysis agitans the author demonstrated complete anæsthesia of the olfactory nerves. In addition the nasal mucous membrane was insensitive.

RIMINI.

311. WELEMINSKY. *Therapeutic reports.*

This paper treats of the tamponade of the nose and drainage of a peritonsillar abscess with paraffin gauze, as practised in Hajek's clinic. In treating ozæna with paraffin injections a small incision is made in the mucous membrane of the septum after a Schleich injection, a pocket of mucous membrane is detached, and paraffin is injected. The site of incision is closed by the packing in order to prevent the escape of the paraffin. To drain the maxillary antrum, a new trocar is recommended, with a canula which, after puncture, remains for some time in the opening in the lower meatus. To cauterize the lower turbinal Schleich's solution is first injected, a small scalpel is introduced into the mucous membrane, and the mucosa is undermined. In this tract a small cautery burner is then introduced. There is hardly any reaction after this method. In congestive conditions of the anterior end of the middle turbinal, scarifications are recommended.

VON EICKEN.

312. KIEFFER. *The relation between tonsillitis and acute articular rheumatism, with particular reference to the prophylaxis of post-anginal rheumatism.*

In all, 2275 cases were diagnosed as acute tonsillitis, the large majority being classed as follicular and bilateral. In the same period of time 1293 cases of articular rheumatism were traced in which there was absolute record of preceding tonsillitis, or 21.3 per cent. The treatment was divided into two series; the first class were treated in the usual way, the average duration of the disease being six days. Superficial and deep ulceration of the tonsils was common, and 15 per cent. developed acute articular rheumatism later. In the second series, in addition to the usual local and constitutional treatment, acetyl-salicylic acid powder was freely applied to the tonsils three times daily, with an average duration of the disease of three days. No swellings, no severe constitutional symptoms, no tendency to erosion of the tonsils were observed. No case of rheumatism developed in this series of cases.

CLEMENS.

313. MORAWECK and HALL. *The use of sheet paraffin in lesions of the nose and throat.*

Splints made of dentist's paraffin are recommended in nasal surgery to prevent adhesions. It is easily cut and bent in any desired shape and is soft enough to conform to the shape of the space in which it is placed. If it is handled with clean hands and shaped with clean instruments and the whole surface thoroughly scraped just before introduction, it is not necessary to place it in irritating antiseptic solutions. Besides being less painful and inconvenient than either the gauze tampon or Bernay splint, it is found to be more satisfactory in preventing adhesions. The splints are used in about 50 per cent. of the author's work.

CLEMENS.

314. DUFOUR. *New and most efficacious method for removing faucial tonsils.*

The proper method to remove faucial tonsils, whether enlarged or not, is to enucleate them. The method employed in children is to give an anæsthetic, insert a mouth gag, and with the proper instruments loosen the tonsil from any attachment from the pillars; then, with tenaculum or forceps

pull the tonsil well out of its bed, slip a wire of a snare made for the purpose over it, and with one stroke enucleate it. The shock of the operation is said to be slight and recovery rapid.

CLEMENS.

315. WILSON. *Some anatomical and physiological considerations of the faucial tonsil.*

After describing the palatine ring and the normal proportions and development of the tonsils, Wilson states that the supply comes from the facial artery, either through a distinct tonsillar artery or more commonly from the tonsillar branch of the facial, and not from the lingual, as stated by Gray. The tonsils reach their full development about the fifth year. There is little support for the opinion that it is a vestigial organ. Respecting the function and secretion of the tonsil, it is considered to be actively engaged in the production of lymphocytes, which pass directly into the lymphatics or through the mucous membrane into the mouth. He thinks more consideration should be given to the effect of the diseases demanding increased leucocytosis on the tonsillar exudations in the mouth, and the relation of this to the disturbances of the buccal and gastric functions.

CLEMENS.

316. RHODES. *Treatment of sarcoma of the naso-pharynx, by injections of adrenalin.*

The author seems to think that this method merits trial, especially in cases of carcinomata and sarcomata of the nose and throat, in which an unfavorable prognosis must almost without exception be made; and the earlier it can be resorted to the better. He believes that it may replace morphine as an analgesic, and while we have no proof of its being curative in its action as yet, it has a palliative effect. In operable cases, in which delay would be dangerous, a resort to surgery, as heretofore, should be the rule.

CLEMENS.

317. KERR. *A new shield for use in nose and throat examinations.*

The shield is made of celluloid, is 7 x 9 inches, and is attached to the posterior surface of the head mirror by four clamps fastened to its surface. The margins are protected by thin strips of aluminum. A hole is made in the shield in the proper

place for the shank of the mirror, and this can be at either side of the centre line, according to which side of the light the patient is placed. It can be easily detached from the mirror to be cleaned, or in case the mirror is to be used without the shield.

CLEMENS.

b.—OZÆNA.

318. BLAU. The treatment of ozæna with paraffin injections. *Arch. f. Laryng.*, vol. xviii., 3.

319. FEIN. Ozæna and the congestive hyperæmia of Bier. *Wien. klin. Wochenschr.*, No. 31. 1906.

320. RÉTHI. Ozæna and congestive treatment. *Wien. klin. Wochenschr.*, No. 39, 1906.

318. BLAU. *The treatment of ozæna with paraffin injections.*

Ten cases of ozæna treated with paraffin injections are reported, in which the injection was performed from one to two years ago. A treatment in the true sense of the word is not obtained, but the unpleasant symptoms are relieved. In five cases, the improvement was so marked that no scab or unpleasant odor was present. In three cases there was a moderate formation of scabs without odor. In two there was no improvement.

VON EICKEN.

319. FEIN. *Ozæna and the congestive hyperæmia of Bier.*

The experiments which this author made with congestions of the neck produced a congestion also in the nasal mucous membrane, though this was not so intense as to produce any influence upon the existing conditions. He then tried to compress the veins by withdrawing the blood from the interior of the nose. This was made possible by the introduction of an instrument like Belocq's tamponade. Four cases were treated without any promising results.

WANNER.

320. RÉTHI. *Ozæna and congestive treatment.*

Experiments were made partly with aspiration, partly with compression of the blood-vessels. In general unsatisfactory results were obtained, as by the preceding investigator.

WANNER.

c.—TUMORS OF THE NOSE.

321. KILLIAN. On the origin of solitary mucoid polypi of the naso-pharynx. *Ann. des mal. de l'oreille*, etc., May, 1906.

322. VACHER and GRAS. A case of epithelio-sarcoma of the ethmoid. *Ann. des mal. de l'oreille*, etc., March, 1906.

323. KIENBOECK. X-ray treatment of sarcoma. *Allgemeine Wien. med. Zeitung*, Nos. 27-35, 1906.

324. DENKER. A new method of operating for malignant nasal tumors. *Münchn. med. Wochenschr.*, 1906, No. 20.

321. KILLIAN. *On the origin of solitary mucoid polypi of the naso-pharynx.*

With the aid of his nasal speculum, Killian found that the pedicle of this remarkable cystic polyp issued out of the accessory opening of the maxillary antrum. The microscopic examination of this part showed that it is not a true pedicle but a part of a cystic wall. This shows that these cases are cases of large cystic polypi, half of which are in the maxillary antrum and half in the naso-pharynx.

BOENNINGHAUS.

322. VACHER and GRAS. *A case of epithelio-sarcoma of the ethmoid.*

The tumor, in an old man, had invaded the left maxillary and the sphenoidal and both frontal sinuses. It was removed after resection of the frontal process of the superior maxilla. There was no microscopic examination and no subsequent observation.

BOENNINGHAUS.

323. KIENBOECK. *X-ray treatment of sarcoma.*

Four cases of sarcoma of the nose and of the accessory cavities were treated, after numerous operations, by radiotherapy. There was transient diminution of pain, in one the tumor decreased, but in all four there was no cure.

WANNER.

324. DENKER. *A new method of operating for malignant nasal tumors.*

Denker has used the following method, in certain cases, to remove malignant tumors of the lateral wall of the nose: Incision of the mucous membrane above the teeth. Retraction of the soft parts on the face of the skull as well as the lower and middle meatus. Removal of the lower turbinal with scissors. A broad removal of the facial wall of the superior maxillary cavity. Resection of the bony nasal wall of this cavity with forceps and chisel. The mucosa of the

lateral wall of the nose is then repeatedly cut away with a blunt-pointed knife. The ethmoid labyrinth and the sphenoidal cavity can then be easily cleaned out. The incision in the mucous membrane is sutured. There never had been any disturbance in the lachrymal apparatus. SCHEIBE.

d.—NASAL SEPTUM.

325. COZZOLINO. On granuloma of the nasal septum. *La Pratica oto-rino-laringoiatrica*, No. 4, 1906.

326. ONODI. The resection of the nasal septum in primary tuberculosis. *Deutsche med. Wochenschr.*, No. 29, 1906.

325. COZZOLINO. *On granuloma of the nasal septum.*

This is a clinical report with a histological examination. As the small tumor of the nasal septum was always preceded by a severe epistaxis, and from the condition found at the microscopic examination, the author believes that vasomotor influences play an important part in the causation of this granuloma of the septum. RIMINI.

326. ONODI. *The resection of the nasal septum in primary tuberculosis.*

Based on the result of the histological examination of an ulcer of the septum, suspicious of carcinoma, the author operated as follows. The process was exposed by a median incision under local anæsthesia, then a part of the septum, 38mm long, 30mm broad, and 12mm thick, was resected. The wound healed and there was no recurrence. Subsequent examination of the extirpated ulcers showed that the condition was not carcinoma, but apparently primary tuberculosis. The other methods of treatment in these cases are then described. In the author's opinion, if a diseased area can be sufficiently surveyed and if it is not too extensive, energetic endonasal curettage is indicated. If not, the operation as just described should be practised. NOLTENIUS.

e.—ACCESSORY CAVITIES.

327. WEISSMANN and FIOCRE. The maxillary sinus and its inflammation in the new-born. *Annales des mal. de l'oreille*, etc., September, 1906.

328. TRÉTROP. Sinusitis and osteomyelitis of the maxillary bone. *La presse oto-laryngologique Belge*, book 8.

329. BÖRGER. On the modification of Friedrich's operation in chronic empyema of the maxillary antrum. *Arch. f. Laryngol.*, vol. xviii., 3.
330. IWANOW. On operations on the maxillary antrum. *Eshemesjatschnik uschnych, nossowych i gorlowych bolesnej*, June, 1906.
331. BUCHER. On the radical operation for chronic maxillary empyema. *M. f. O.*, 1906, No. 6.
332. NIELSEN. A case of chronic empyema of the maxillary antrum without nasal symptoms. *Ugeskrift for Læger*, 1906, No. 22.
333. HOFMANN. An inflammatory affection of the orbit and of the eye, following suppurations in the accessory cavities and in the nose. *Z. f. Augenheilk.*, xvi.
334. MEISSNER. A case of monolateral empyema of the accessory cavities of the nose with involvement of the eye. *Wien. med. Wochenschr.*, No. 32, 1906.
335. SCHMIEGELOW. On the relation between affections of the nose and of the eye. *Arch. f. Laryngol.*, vol. xviii., 3.
336. BAUMGARTEN. Acute inflammations of the eye following acute nasal disease. *M. f. O.*, 1906, No. 5.
337. SHIRMUNSKI. On acute inflammation of the maxillary antrum and of the frontal sinus. *Eshemesjatschnik uschnych, gorlowych i nossowych bolesnej*, September, 1906.
338. UFFENRODE. On Sondermann's suction method in diseases of the accessory cavities. *Münchn. med. Wochenschr.*, 1906, No. 24.
339. HEERMANN. On the conservative treatment of empyemata of the accessory sinuses. *Münchn. med. Wochenschr.*, 1906, No. 34.
340. JACQUES. On the operation for chronic frontal sinusitis. *Ann. des mal. de l'oreille*, etc., February, 1906.
341. RITTER. A new method to preserve the anterior wall of the frontal sinus in the radical operation of chronic frontal sinusitis. *Deutsche med. Wochenschr.*, No. 32, 1906.
342. CLAOUÉ. Osteomyelitis of the skull in the course of an empyema of the maxillary and frontal sinuses. *Ann. des mal. de l'oreille*, etc., April, 1906.
343. WHEBLOCK. Abscess of maxillary antrum causing symptoms of acute articular rheumatism. *American Medicine*, February 17, 1906.
344. JACK. Report of four cases showing the result of Killian's operation. *Jour. Am. Med. Ass'n*, July 21, 1906.
327. WEISSMANN and FIOCRE. *The maxillary sinus and its inflammation in the new-born.*

The author adds one more case to the five previously mentioned in literature. These six cases show that, when, in a new-born child during the first weeks or months, an abscess develops in the cheek with discharge of pus from the nose and swelling of the gums, there is a purulent periostitis of the

superior maxilla and an empyema of the maxillary antrum. The etiology is not defined: in one case, pressure of the forceps during birth; in two, ulceration of the nipple in the mother. Treatment is a broad incision, with curettage of the granulations and of the sequestrum. BOENNINGHAUS.

328. TRÉTROP. *Sinusitis and osteomyelitis of the maxillary bone.*

Two cases of osteomyelitis of the superior maxilla are reported, which is a serious disease likely to be acquired and difficult to treat. The treatment consists in drainagè, antiseptic irrigation, removal of the sequestrum, or an extensive operation from the anterior surface. BRANDT.

329. BÖRGER. *On the modification of Friedrich's operation in chronic empyema of the maxillary antrum.*

This modification is as follows: The incision is made within the vestibule of the mouth; the mucosa of the external surface of the lower meatus is separated by packing. Then the nasal crust and the part of the bone which forms the pyriform aperture, and a large part of the anterior wall of the maxillary cavity is removed. Then the internal wall of the antrum, near the lower meatus, is resected. The diseased mucous membrane is removed, and the mucosa of the lower meatus furnishes a flap which is turned into the antrum. Sometimes a part of the lower turbinal is removed. The wound is packed. The cases were usually complicated with an empyema of the ethmoid cells. VON EICKEN.

330. IWANOW. *On operations on the maxillary antrum.*

According to this author, the most complete operation suggested for the superior maxilla is that of Denker. In four cases it has given good results. SACHER.

331. BUCHER. *On the radical operation for chronic maxillary empyema.*

Report of 15 cases of chronic empyema of the maxillary antrum from Jurasz's clinic, which have been operated upon by Jurasz's method, from the alveolus. It is essential that the palate is shallow and that the alveolar process is broad. The cases of dental empyema, and especially those where a defect in the teeth is present, are applicable. WITTMACK.

332. NIELSEN. *A case of chronic empyema of the maxillary antrum without nasal symptoms.*

A swelling of the canine fossa had existed for five years and now it was fluctuating. There was a fistula in the region of the second molar tooth. On incision a fistula was found leading into the maxillary sinus. This was enlarged and a serous non-fetid fluid relieved. The irrigating fluid did not enter into the nose. The case can therefore be regarded as a dentigerous cyst.

MÖLLER.

333. HOFMANN. *An inflammatory affection of the orbit and of the eye, following suppurations in the accessory cavities and in the nose.*

Complete description of the anatomical paths along which a suppuration extends from the nose to the eye, and a general description of the literature, with the addition of certain personal observations.

BRUEHL.

334. MEISSNER. *A case of monolateral empyema of the accessory cavities of the nose, with involvement of the eye.*

The patient, a woman thirty-seven years of age, had frequently complained of right-sided headache for one year. The right eye became suddenly blind. There was no exophthalmos. The diagnosis of retrobulbar neuritis was made. Three days later the right upper lid became swollen, the upper orbital margin tender, and a round prominence appeared at the inner and upper angle. Examination of the nose revealed an empyema of the right maxillary antrum. After removing a hypertrophy of the turbinals the vision improved, though the improvement was not marked until after the ethmoid cells and the frontal sinus had been exposed.

WANNER.

335. SCHMIEGELOW. *On the relation between affections of the nose and of the eye.*

This is a review of the cases of retrobulbar optic neuritis found in literature which were caused by suppurations in the accessory cavities of the nose. The personal observations are added, which are of interest, because the pus in the upper meatus was not demonstrated until after the olfactory fissure had been thoroughly cocaineized. The neuritis in both cases healed after the diseased cells had been treated.

VON EICKEN.

336. BAUMGARTEN. *Acute inflammations of the eye following acute nasal disease.*

A number of interesting cases are reported in which acute symptoms on the part of the eye followed acute affections of the interior of the nose—one-sided exophthalmos, bilateral chemosis following serous ethmoiditis, chemosis and ulcers of the nasal septum, paresis of the internal rectus and inferior oblique, causing diplopia after affection of the sphenoidal sinus, orbital and supraorbital neuralgia caused by a purulent ethmoidal bulla, exophthalmos and serous inflammation of the sphenoidal cavity. The connection between the affections of the nose and of the eye is clear because the ocular symptoms disappeared immediately upon treating the nose.

WITTMACK.

337. SHIRMUNSKI. *On acute inflammation of the maxillary antrum and of the frontal sinus.*

Eleven cases are reported. To facilitate the escape of pus adrenalin is used. The pain in the forehead is relieved by bromide of quinine and electric-light treatment. SACHER.

338. UFFENRODE. *On Sondermann's suction method in diseases of the accessory cavities.*

Two cases of suppuration of the superior maxilla in which, after suction, puncture and irrigation always caused more discharge to appear. Therapeutically, therefore, the value of suction is slight; its diagnostic importance the author apparently undervalues.

SCHEIBE.

339. HEERMANN. *On the conservative treatment of empyemata of the accessory sinuses.*

Heermann recommends the opening of the accessory cavities from the nose, and describes some instruments of his own. In order to expose the lower meatus, the lower turbinal is temporarily turned up with the aid of Killian's septal forceps. In cleansing the accessory cavities the author always uses suction.

SCHEIBE.

340. JACQUES. *On the operation for chronic frontal sinusitis.*

Jacques believes that one should individualize in selecting

the operation in empyema of the frontal sinus: 1. In small and moderate frontal sinuses,—in other words in most cases,—resection of the anterior wall according to Luc-Ogston, combined with resection of the frontal process of the superior maxilla and of the anterior ethmoidal cells according to Taptas. 2. In large frontal sinuses—that is, in exceptional cases—the operation according to Killian. This standpoint is the one shared by most French rhinologists, and is unquestionably correct.

BOENNINGHAUS.

341. RITTER. *A new method to preserve the anterior wall of the frontal sinus in the radical operation of chronic frontal sinusitis.*

Ritter has operated upon two cases of frontal sinus empyema by first removing the floor of the frontal sinus and then making, at the highest point, another small opening in order to gain access to all parts of the frontal sinus. He prefers this to Killian's method, though in one of the cases a moderate discharge persisted from a small depression.

The reviewer does not share this opinion, but believes that Killian's operation is superior to any as regards thoroughness of operating. Based upon an experience of 50 operations performed according to this method, if the crust of bone is sufficiently broad (1-1½ cm) the cosmetic result is excellent. If necessary, an injection of paraffin will obviate the depression above this crust.

NOLTENIUS.

342. CLAOUÉ. *Osteomyelitis of the skull in the course of an empyema of the maxillary and frontal sinuses.*

This is a classical case with fatal termination. In an old case of suppuration of the maxillary antrum and of the frontal sinus, the maxillary antrum was operated on according to Caldwell-Luc. Then, slowly, an ascending osteomyelitis of the frontal bone developed, which, notwithstanding numerous operations, continued, and 3½ months later led to death through thrombosis of the longitudinal sinus and an intradural abscess with purulent meningitis.

BOENNINGHAUS.

343. WHEELLOCK. *Abscess of maxillary antrum causing symptoms of acute articular rheumatism.*

Wheelock reports a case of pneumococcus infection of the

maxillary antrum which was followed by symptoms of acute articular rheumatism in the knee joint, left shoulder, and elbow. The antrum was opened, and after several washings the case made a rapid recovery. CLEMENS.

344. JACK. *Report of four cases showing the result of Killian's operation.*

The cases were operated upon for chronic suppurative ethmoiditis with abscess breaking into the orbit. Convalescence was rapid and uncomplicated. The wounds healed by first intention, except in Case 2. Tampons to prevent hemorrhage were removed in twenty-four hours. There was no ethmoid packing and no after treatment, except gentle cleansing of the nose. The supraorbital scar in all the cases is now covered by the eyebrow. The nasal scar is scarcely distinguishable. The contour is preserved by the supraorbital bridge. The results of the X-ray examination have not been satisfactory and its value in skiagraphy is not perfectly determined. CLEMENS.

f.—OTHER DISEASES OF THE NOSE.

345. ZARNIKO. *On the treatment of hay fever with pollantin.* *Berl. klin. Wochenschr.*, No. 37, 1906.

346. HARBITZ. *A peculiar lesion of the forehead.* *Norske magasin for lægevidenskaben*, 1906, No. 9.

347. CABOCHE. *Two cases of naso-lachrymal tuberculosis.* *Ann. des mal. de l'oreille*, etc., September, 1906.

345. ZARNIKO. *On the treatment of hay fever with pollantin.*

Zarniko has studied the answers received in regard to the results of treatment with Dunbar's pollantin in the year 1906. These included 492 cases. Of the 287 European cases, 66 per cent. were treated with an excellent result, 27 per cent. with a moderate result, and 7 per cent. were unimproved. Of the 205 American cases, the percentages were 51.1, 17, and 27.8.

The difference between these numbers and those of the statistics of the Hay Fever Association is difficult to explain. According to the latter, 26.5 per cent. were treated with excellent result, 42.5 per cent. with moderate result, 31 per cent. without result.

The following practical points are of interest: The treatment with pollantin should only be employed prophylactically. Every time only a small amount of powder should be applied; large amounts are not well tolerated by many people. If, notwithstanding proper dosage, unpleasant effect is observed, it is well to try a tube of a different factory number. In doubtful cases, to confirm the diagnosis, it is well to use pollen toxin in the form of the "Aid to the Diagnosis of Hay Fever." The severity of the hay-fever attack is not inversely proportional to the action of the serum. . . . MUELLER.

346. HARBITZ. *A peculiar lesion of the forehead.*

A man, 30 years of age, during a fight, received the point of an umbrella in his nose. The point was broken off and was extracted by the patient himself. On examination he was a little dazed, there was some bleeding from the nose, and the left eye protruded. During the following days there was some fever, but the patient otherwise seemed pretty well. On the fourth day, stupor, increasing fever, vomiting, coma. Examination of the nose proved without result. On the 12th day, death. Autopsy: fracture of the roof of the nose and of the sphenoidal bone. There was a canal in the left frontal lobe of the brain which extended to the left lateral ventricle. Purulent infiltration at the base of the brain and pus in the ventricles. There is no lesion of the nasal mucous membrane except at the inner surface of the upper turbinal.

JOERGEN MOELLER.

347. CABOCHE. *Two cases of naso-lachrymal tuberculosis.*

In both cases a lachrymal fistula led to an examination of the nose. The septum was found normal, the lower meatus, however, full of tubercular granulations. Care should be taken in examining that part of the nose between the lower turbinal and the lateral wall of the nose, both with the probe and, if necessary, with the aid of a Killian's speculum.

BOENNINGHAUS.

g.—NASOPHARYNX

348. JOHNSTON. *Congenital membrane in the nasopharynx.* *Jour. American Medical Ass'n*, September 1, 1906.

349. LANGE. *Old and new on the question of adenoids.* *M. f. O.*, 1906, No. 9.

350. SCHMIDT. *True papilloma of the nasopharynx.* *Arch. f. Laryng.*, vol. xviii., 3.

351. SEREBRJAPOFF. *On involution of the normal and hyperplastic pharyngeal tonsil.* *Arch. f. Laryng.*, vol. xviii., 3.

352. SUAREZ DE MENDOZA. *On the diagnosis and treatment of adenoid vegetations.* Paris, 1906. Price 5 frs.

348. JOHNSTON. *Congenital membrane in the nasopharynx.*

Patient, female, aged 35, complained of dryness of the nasopharynx and great difficulty in removing the secretion. There was constant tinnitus in the left ear. Examination showed the pharynx to be dry and covered with a thick layer of grayish secretion. After cleansing, a distinct membrane was discovered, coming down from the roof of the nasopharynx and extending entirely across the cavity, dividing the space into an anterior and posterior part. The membrane had its origin behind the openings of the Eustachian tubes, neither of which was visible. About the centre of the membrane was a round perforation, extending more to the right than to the left. Through this opening the lower two-thirds of the septum and the turbinates could be seen. The membrane passed downward and became gradually lost on the posterior wall of the soft palate. No specific history could be obtained, and there is no doubt in the mind of the writer that it was congenital. There was no operation. CLEMENS.

349. LANGE. *Old and new on the question of adenoids.*

Lange is opposed to the too rapid and too early operations for the removal of adenoid vegetations. The operation should be performed only by experts. Of importance in the treatment of adenoids is the nasopharyngeal catarrh, which should not be overlooked. The general treatment is of importance. The enuresis of children is a neuropathic condition independent of adenoids.

WITTMACK.

350. SCHMIDT. *True papilloma of the nasopharynx.*

The tumor was removed with Beckman's ring knife. Microscopic examination showed it to be a true papilloma.

VON EICKEN.

351. SEREBRJAHOFF. *On involution of the normal and hyperplastic pharyngeal tonsil.*

Statistical examinations have shown that the involution of the normal and of the moderately enlarged pharyngeal tonsil occurs with regularity, beginning with the age of puberty and continuing to the 25th year. The histological process consists in the transformation of the epithelial covering of the adenoid growths to squamous epithelium, when the character of the cylindrical epithelium is lost. The adenoid tissue is rarefied by the appearance of numerous vascular fissures (lymph and blood vessels). The follicles and their germ cell centres are the last to disappear. Associated with the retrogression of these adenoid tissues there is a formation of cysts.

VON EICKEN.

352. SUAREZ DE MENDOZA. *On the diagnosis and treatment of adenoid vegetations.*

This monograph of 207 pages treats the subject in an enthusiastic and exhaustive manner. The author thinks that it is extremely difficult to define the influence that adenoid vegetations have on the skull, in the development of the thorax and other distant organs. He is opposed to narcosis, especially bromid of ethyl, because a number of fatal cases have occurred, to his own knowledge, which were not published.

OPPIKOFEK.

PHARYNX AND MOUTH.

353. CASSELBERRY. The indications for surgical interference in disease of the faucial tonsils and the methods of choice in operating; an analysis of 480 cases. *Laryngoscope*, June, 1906.

354. CONKEY. Sarcoma of both faucial tonsils. *Laryngoscope*, June, 1906.

355. STEIN. The indications for the surgical removal of the tonsils and the best method for doing so. *Chicago Medical Recorder*, August 15, 1906.

356. SMITH, C. M. A case of tonsillar chancre. *Jour. Cutaneous Diseases*, January, 1906.

357. GERSON. On the treatment of angina lacunaris. *Med. Klinik*, 1906, No. 39.

358. PULVERMACHER. On the etiology of leukoplakia of the mouth. *Wien. klinische therapeutische Wochenschr.*, No. 39, 1906.

353. CASSELBERRY. *The indications for surgical interference in disease of the faucial tonsils and the methods of choice in operating; an analysis of 480 cases.*

Indications for operating are both systemic and local. Certain types of rheumatism, endocarditis, nephritis, and phlebitis indicate that the tonsils serve as portals of infection. The occurrence of nephritis has been repeatedly observed to follow tonsillitis, and, while it is usually temporary, albuminuria with casts in one case persisted for years. Cervical adenitis in any degree of persistency must be regarded as an indication for immediate tonsillectomy. In 277 cases under 14 years of age (165 of which had ether anæsthesia, and 112 had local anæsthesia) no case of unusual hemorrhage occurred. The ratio of recurrences in the ether series is 1:6 and in the cocaine series 1:4. The recurrences were in no sense hypertrophic but more in the form of troublesome tonsillar disease. In 203, mostly double operations, in the adult, serious hemorrhage occurred in 14. The author describes his method of operation and the instruments used.

CLEMENS.

354. CONKEY. *Sarcoma of both faucial tonsils.*

Case, aged 52, female, had enlarged tonsils, pearly white in color, glistening and lobulated. Upon the right tonsil there was an ulceration as large as a dime. Large and increasing doses of the iodide with a $\frac{1}{4}$ of hydrarg. bichlor. failed to make any favorable impression on the course of the disease. After curetting, both tonsils rapidly increased in size and the cervical glands on both sides became enlarged. The hypertrophies were then removed with the galvano-cautery, and at the time a large mass of similar appearance was discovered at the base of the tongue. This was also destroyed by the cautery. The surfaces since operating have been subjected to the X-ray treatment and nothing seems to have been accomplished thereby but a slight retarding of the pathological process.

CLEMENS.

355. STEIN. *The indications for the surgical removal of the tonsils and the best method for doing so.*

The best method is considered to be the one which insures the possibility of the removal of all the gland. The method

used is one that combines dissection and the tonsillotome. The author proceeds as follows: After the tonsil and faucial pillars have been anæsthetized, the gland is dissected from its attachments. To do this thoroughly, the gland must be deeply and firmly engaged in tenaculum forceps, one set of prongs in the highest accessible part and the other set deeply buried into its base. Traction is made inward, toward the mouth, downward and backward, which is aided by a backward rotation of the engaged forceps. The attachments are all now drawn taut, and with a small bistoury or curved scissors incision is commenced well up in the epitonsillar fossa and is carried down along the anterior edge of the palato-glossal muscle, hugging the capsule and avoiding muscular fibres. Posterior attachments are severed in the same manner, by reversing the rotation of the engaged forceps to a forward position. Special effort should be made to liberate the large mass of the gland tucked away in the epitonsillar fossa. The tonsillotome is now made use of to encircle the gland and, with strong traction with the forceps, the remaining attachments are severed at one stroke. Curved scissors, or the cold or electric cautery loop, may be used instead of the tonsillotome, with success.

CLEMENS.

356. C. M. SMITH. *A case of tonsillar chancre.*

Male, aged 26 years, had sore throat for a month. There was a marked roseola generally distributed over the body, but no evidence of any sore about the genitals, or prominent enlargement of the inguinal glands. On the right tonsil was a deep ulceration surrounded by a zone of redness, infiltration and the glands under the angle of the jaw were distinctly enlarged. No history of infection could be obtained.

CLEMENS.

357. GERSON. *On the treatment of angina lacunaris.*

Crypts in the tonsils are probed and cauterized with a probe dipped in carbolic acid or other caustic agent.

BRUEHL.

358. PULVERMACHER. *On the etiology of leukoplakia of the mouth.*

Of 54 cases one only was a female. 42.6 per cent. of the

cases were syphilitic. In addition, the indulgence in tobacco plays an important rôle in the etiology. The same result as in the combination of syphilis and tobacco can also be obtained by an increased dose of tobacco.

The combination with a certain affection of the skin is unquestionable. This is characterized by an increased horny development; pachydermia of the larynx, closely related to leukoplakia, and the use of mercury have been shown to be of etiological importance.

WANNER.

BOOK REVIEWS.

I.—**Chirurgie Oto-Rhino-Laryngologique.** By GEORGES LAURENS. (*Traité de médecine opératoire et de thérapeutique chirurgicale*, published under the direction of Paul Berger and Henri Hartmann.) Paris: G. Steinheil, 1906. 976 pages. Price 30 francs.

The part in this "Treatise on Operative Medicine and Surgical Treatment" devoted to the ear, nose, and throat is a formidable volume of nearly 1000 pages. The size and elaborateness testify to the surgical development of these specialties in recent years. As the author states in the preface, the contemporary school of Otology has profited by a surgical education, and that, while formerly the specialist operated rarely and then only by the natural ways and the surgeon only by the external routes, the up-to-date otologist must be conversant with both methods.

The operative procedures are systematically described and usually preceded by a description of the methods of examination. The indications follow for rational and conservative treatment. Due attention is given to the subject of after-treatment which, as the author correctly states, requires specialistic care.

In the introduction general information is given on illumination, anæsthesia, asepsis, and hemostasis. This agrees with the teachings of general surgery slightly modified according to French usage. The prolixity of instruments in this specialty the author deplores, suggesting sensibly that our aim should be to simplify and reduce the armamentarium. Under hemostasis, mention is made of an original method of blood aspiration. This, applicable especially to mastoid work, consists in the suction of blood during operation by means of the

vacuum principle, similar to the procedure followed by dentists in removing saliva.

To simply draw attention to a few features of this excellent book, the surgery of the labyrinth is fully described. In the after-treatment of the tympano-antral exenteration, packing is used for 1 or 2 dressings and then boric acid insufflation according to Eemann. A short chapter is devoted to vertebro-hypocranial operations in otitic suppurations at the base of the skull. There are 3 elective areas for the propagation of pus from the mastoid to the base of the skull: (1) the region of the tip; (2) the area between the sinus and the posterior canal wall below the antrum; (3) the sigmoid sulcus and cerebellar dura. The operation for exposing the jugular bulb is clearly described. An important feature are the illustrations which are carefully selected and are well drawn. The book is instructive and complete.

A. K.

II.—Some Points in the Surgery of the Brain and its Membranes. By C. A. BALLANCE, M.V.O., M.S., etc. London: Macmillan & Co., 1907.

This is the subject of the Lettsomian Lectures for 1906, and considers the surgery of the cerebral membranes, abscess and tumor of the brain. A more or less complete picture of these conditions is given, together with modern views on the pathology, brain localization, and treatment. The text is enriched by pertinent case-histories, many of them personally observed, and by excellent illustrations.

In chronic suppuration in the nasal accessory cavities, just as in temporal bone suppuration, Mr. Ballance favors complete ablation of diseased bone. If this is neglected, the opportunity for a preventive operation has gone by and meningitis may result; even then surgery is not helpless though the chances for recovery are much lessened. The results obtained in the operative treatment of purulent meningitis are encouraging, and the author thinks that "we are no longer justified in regarding these cases as hopelessly lost."

In the treatment of otitic brain abscess, Mr. Ballance recommends that the pathway of the infective process through the bone should be followed, and the brain exposed at the pos-

terior wall of the antrum or at the tegmen. Drainage should be attempted through the narrow portion or stalk of the abscess. If necessary, a counter opening should be made, and if time permits, after opening the dura the wound is packed with gauze to isolate the brain area by adhesions where the incision is to be made. To incise the brain nothing is better than a narrow, long knife. "The operation for brain abscess has advanced a good stage towards perfection" and "the future is bright with promise."

These lectures written in a most attractive style and coming from such an authoritative source will be studied with pleasure and profit by every one interested in cerebral surgery.

A. K.

III.—Surgical Anatomy of the Temporal Bone. By ARTHUR H. CHEATLE, F.R.C.S., etc. London: Churchill, 1907. 131 pages.

In 1906 Mr. Arthur Cheatile delivered the Hunterian Lectures on the Surgical Anatomy of the Temporal Bone, based on 500 anatomic specimens. These lectures are now printed in book form, with many excellent illustrations of the bone specimens.

There is no part of Otology which arouses so much interest in every one as the anatomy of that remarkable structure—the temporal bone, and this masterly presentation of the subject will serve to refresh many points in the memory of the busy aural practitioner and undoubtedly suggest many new viewpoints. For these lectures do not consist only in a description of anatomic peculiarities, but everywhere points of the greatest practical bearing are constantly brought forward.

The book is arranged as follows: Lecture I: The temporal bone at birth. The surgical anatomy of the labyrinth. Lecture II: Superficial changes in the bone during growth. The relation of the lateral sinus to the surface. Consistence of the outer antral wall and mastoid process. Variations in the antrum. Variations in the middle ear proper. Lecture III: The surgical importance of the antrum. Guides to the antrum. The facial nerve. The petro-squamosal sinus. Division of the auditory nerve, etc.

A. K.

ARCHIVES OF OTOTOLOGY.

HERPETIC INFLAMMATIONS OF THE GENICULATE GANGLION. A NEW SYNDROME AND ITS AURAL COMPLICATIONS.¹

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(With two illustrations on Text-plate II.)

INTRODUCTION.

THE subject of this communication was presented at a meeting of the American Neurological Association held in Boston, June, 1906. A further presentation was made at the conjoint meeting of the New York and Philadelphia Neurological Societies held in New York, March, 1907. These dealt in detail with the neurological aspects of the subject. In the present communication the otological features will be emphasized more particularly, especially the otalgia, the herpes zoster of the concha and external auditory canal, and the symptoms of Ménière's disease which represent important aural complications of the affection.

Briefly, the syndrome is dependent upon a specific herpetic inflammation of the geniculate ganglion, situated on the facial nerve in the depths of the internal auditory canal in the entrance to the aqueduct of Fallopius. The

¹Read before the Section on Otology of the New York Academy of Medicine, April, 1907.

simplest expression of this inflammation is to be found in the herpes zoster of the tympanum, auditory canal, and the concha (*this representing the zoster zone for the geniculate ganglion*). Because of the proximity of the facial nerve and the terminations of the auditory nerve, neural complications are not infrequent: peripheral facial palsy, tinnitus aurium, deafness, and symptoms of Ménière's disease. The pathology of the affection does not differ from that of true herpes zoster, or zona. This, as has been shown by the elaborate pathological studies of Head and Campbell, depends upon a specific inflammation of the posterior spinal ganglia. While one ganglion is usually the seat of the chief manifestation of the disease, the neighboring and adjacent ganglia may also show slight inflammatory changes. Evidence of this multiplicity of lesions is shown clinically by the occurrence of double bilateral and, rarely, triple forms of zona, which are especially frequent in the region of the face, head, and neck.

The facial nerve is a mixed nerve. Its sensory ganglion is the geniculate; its afferent root is the nerve of Wrisberg; its efferent, the facial nerve proper. The peripheral divisions of the geniculate ganglion are the great and small superficial petrosal nerves and the external petrosal nerve, the latter passing to the carotid plexus of the sympathetic; the former, to Meckel's and the otic ganglia respectively. Furthermore, both the greater and lesser superficial petrosal nerves participate in the formation of the tympanic plexus through the great and small deep petrosal nerves. (See Fig. 1.) As the geniculate ganglion contains cells of the spinal ganglion type, it, like the Gasserian ganglion, may properly be brought within the realm of the specific inflammation of herpes zoster.

The ganglionic representations of the cephalic extremity of the body roughly outlined are as follows: The Gasserian ganglion for the face, the geniculate ganglion for the concha and auditory canal, the second,

third, and fourth cervical ganglia for the occiput and neck,—any zoster inflammation of these giving rise respectively to herpes facialis, herpes auricularis, and herpes occipito-collaris. As the tendency of the specific inflammation of zona is to produce inflammatory changes in a series of ganglia, although its chief manifestation is in a single ganglion, it would follow that when the chief focus is in the Gasserian ganglion, an inflammatory reaction might also occur in other ganglia of this series (the geniculate, second and third cervical ganglia).

In this manner I would explain that group of cases with facial palsy and acoustic symptoms in which the eruption is distributed over the face or neck, the zone for the geniculate ganglion itself remaining free. I have collected sixty-one cases of true herpes zoster including five personal observations presenting a peripheral facial palsy, in which the eruption was distributed over the face, neck, or ear. Of this number, twenty showed also an involvement of the auditory nerve. The distribution of the eruption in these cases was as follows:

Herpes occipito-collaris.....	32 cases.
Herpes auricularis.....	13 “
Herpes facialis.....	12 “
Herpes occipito-collaris and auricularis.....	3 “
Herpes facialis and occipito-collaris.....	1 case.

The herpetic inflammation of the geniculate presents the following clinical types:

1. Herpes auricularis.
2. Herpes auricularis, facialis, or occipito-collaris, with facial palsy.
3. Herpes auricularis, facialis, or occipito-collaris, with facial palsy and hypoacousis.
4. Herpes auricularis, facialis, or occipito-collaris, with facial palsy, deafness, and symptoms of Ménière's disease.

HERPES AURICULARIS, OR HERPES OTICUS.—This manifestation of herpes zoster has been recognized by all

systematic writers. It has, however, always been referred to the trigeminus nerve or ganglion, or to the cervical ganglia or nerves. Up to the time of the publication of my paper, the only recognized localization of an herpetic inflammation on a cranial nerve ganglion was the Gasserian. While there is no question that the eruption may involve the anterior and posterior portions of the auricle in cervical and facial herpes, there is a well-defined clinical type dependent upon a geniculate inflammation in which the eruption is distributed over the concha, external auditory canal, and the tympanic membrane. I would therefore restrict the use of the terms "herpes oticus" and "herpes auris" to this distribution.

As with herpes zoster in general, mild prodromal symptoms not infrequently precede the onset of the pain. In herpes auris, the preherpetic pains are referred to the depths of the ear, external auditory canal, and the auricle. These may reach an extreme degree of severity. In a few cases the tympanic membrane itself has been incised to relieve a supposed middle-ear inflammation. In severe cases not only are pains felt in the interior of the ear but they radiate also in the three branches of the fifth nerve, and to the mastoid, occipital, and cervical regions. In many cases the auricle becomes red and swollen, and quite tender, assuming an erysipelatous or frost-bitten appearance; the external auditory canal may be practically occluded by the swollen tissues, thereby inducing a mechanical interference with hearing which must not be confused with the deafness resulting from true lesions of the auditory nerve, which will be described later.

Usually on the third or fourth day the characteristic eruption makes its appearance, the abundance of the vesicles varying greatly in different cases. In rare instances the vesicles have been confined to the tympanic membrane, with all the other manifestations of true

herpes zoster.¹ In one of my own cases with facial palsy and hypoacusis, only two very small patches were present, one at the inferior border of the external meatus, the other beneath the anthelix.

From an analysis of thirteen cases of herpes oticus, I would confine the zoster zone to the tympanum, external auditory canal and meatus, the concha, tragus, and antitragus; also an adjacent marginal area which coincides with the tendency of these zones to overlap.

As bilateral herpes zoster of the Gasserian ganglion is occasionally observed, it would seem probable that the geniculate ganglia might also be the seat of a bilateral involvement. Such a case is recorded by Chavanne.²

The eruption follows the usual course of zoster, all trace, save a few pigmented scars, disappearing in the course of a fortnight. Post-herpetic otalgias in this group of cases are often very severe and persistent, especially in the old.

HERPES AURICULARIS, FACIALIS, OR OCCIPITO-COLLARIS WITH FACIAL PALSÝ.—In this group the inflammation has extended to the trunk of the facial nerve. Its confinement within a narrow bony canal may also by pressure play a rôle in the production of this symptom. The palsy may appear with the eruption, or it may be delayed a week or even longer. As its onset is often insidious, it is frequently overlooked, so that too much stress should not be laid upon the patient's statements as to the time of its appearance. As the occurrence of repeated crops of vesicles are not infrequent in zoster, it is possible that a succession of inflammatory changes may be taking place within the affected ganglion. This might in some cases explain the length of time intervening between the appearance of the eruption and the palsy. The palsy

¹ Szenes, "Herpes Zoster des Trommelfelles," *Internat. Centralbl. für Ohrenheilk.*, i., 1902.

² "Zona bilaterale, isole de l'oreille," *Annal. des mal. de l'oreille*, 1906, p. 639.

in all of the sixty-one cases was complete, involving all branches of the nerve.

A rather striking peculiarity is the not infrequent evanescence of this symptom, in some cases lasting only a few days, and many of them clearing up within a month. More severe types of the paralyses, however, occur with reactions of degeneration, and leaving permanent weakness and contractures. In a very large proportion of cases the sense of taste was affected on the anterior two-thirds of the tongue, which is readily explained by the involvement of the chorda-tympani nerve at the geniculate level.

As has already been remarked, facial palsies may occur with herpes occipito-collaris, and herpes facialis, as well as with herpes auricularis. This I would explain by the simultaneous occurrence of inflammatory changes in a series of ganglia.

HERPES AURICULARIS, FACIALIS, OR OCCIPITO-COLLARIS, WITH FACIAL PALSY AND HYPOACOUSIS.—In this group, in addition to the herpetic manifestations and the facial palsy, there is hypoacusis. The presence of auditory symptoms is to be explained by the extension of the products of inflammation to the acoustic nerve. If this is transitory and slight, it is the result of inflammatory oedema only; if more severe, the nerve trunk is probably directly invaded by the inflammatory process.

HERPES AURICULARIS, FACIALIS, OR OCCIPITO-COLLARIS, WITH FACIAL PALSY, DEAFNESS, AND SYMPTOMS OF MÉNIÈRE'S DISEASE.—This is the severest and most interesting manifestation of the disease. Here, in addition to the facial palsy and deafness, there are present the classical symptoms of Ménière's syndrome,—tinnitus aurium, disturbances of the equilibrium, nystagmus, vomiting, and labyrinthine vertigo. Of the twenty cases which presented symptoms of involvement of the auditory nerve, nine showed hypoacusis only. In the other eleven the symptoms of Ménière's disease were present.

The distribution of the eruption in these cases was as follows:

Herpes occipito-collaris.....	9 cases
Herpes auricularis.....	7 "
Herpes facialis.....	4 "

Before leaving this subject I would call attention to the occasional presence of auditory symptoms in cases of herpes about the face and neck in which facial palsy was absent. Gruber¹ noted in his cases of herpes auris that there were tinnitus and diminished hearing, and referred these to a probable reflex involvement of the auditory nerve. The same peculiarity was observed by Vail² in his case of herpes auris. As facial palsy in these cases is often very transient, it may possibly have been overlooked, for if, as I infer, the auditory symptoms are dependent upon an extension of the inflammation from the geniculate, one would hardly expect to find them present without facial palsy, as the inflammation must traverse the trunk of the seventh to reach that of the eighth.

I also find that in some cases of herpes facialis auditory symptoms were present without facial palsy (Cassé³ and Burin-Desrozier⁴), so the thought naturally suggests itself that the ganglia of the acoustic nerve may also be brought within the realm of the specific infection of herpes. (See Fig. 2.)

It will be recalled in this relation that the ganglion acousticum is an outgrowth of the so-called neural ridge, from which the Gasserian, geniculate, and posterior spinal ganglia take their origin. In the course of development the cells of the geniculate ganglion assume the spinal unipolar type, whereas those of the acoustic

¹ "Herpes auricularis," *Monats. f. Ohrenheilk.*, 1875, No. 5.

² "Herpes zoster auris," *Jour. Laryngol. and Rhinol.*, 1907.

³ "Zona de la troisième branche du trijumeau," *Thèse de Paris* 1901.

⁴ "Zona de la deuxième branche du trijumeau," *Thèse de Paris*, 1904.

ganglia (ganglion of Corti, and ganglion of Scarpa) retain their primitive bipolar character. But the extreme severity and persistence of the acoustic symptoms in some of these cases, and the occurrence of acoustic symptoms without facial palsy, and the origin of these cells in the neural ridge, seem to me strong evidence that herpetic inflammation of the acoustic ganglia may occur in the cephalic forms of zona.

DIAGNOSIS.—The diagnosis of these cases is not difficult. The prodromal symptoms, the intense neuralgic character of the pain (pre- and post-herpetic neuralgia and otalgia), with the appearance of the characteristic eruption, should separate this from all other affections of the ear; and yet I believe that many of the cases are not recognized and properly classified. The area of the eruption is often so small, and the redness, swelling, and tenderness of the auricle so great, that many cases, I have no doubt, are regarded as diffuse inflammations of the auricle, perichondritis, frost-bite, and the like. In the later stages, with itching and scaling, the affection might be confused with eczema of the auricle.

That the condition is frequently overlooked would seem to be confirmed by hospital statistics. That the affection is not a common one is shown by Gruber's series, who found five cases in 20,000 cases of ear disease. To ascertain, if possible, some knowledge of the frequency of the affection in this country, I examined the annual reports of several of our large eye and ear hospitals, with the following result:

In the Manhattan Eye and Ear Hospital, during a period of ten years, with a total of 47,600 cases, the diagnosis of herpes auris was made in two instances.

In the Brooklyn Eye and Ear Hospital, during a period of five years, with a total of 15,000 cases, the diagnosis was made but once.

In the New York Eye and Ear Infirmary, one of the

largest institutions of its kind, during the past twenty years, this diagnosis was recorded only six times.

In the Massachusetts Eye and Ear Infirmary, however, during a period of ten years, with a total of 65,000 cases, the diagnosis was recorded thirty-three times.

In these reports it is not stated whether the zoster was primary or secondary, but the infrequency with which the diagnosis was made is worthy of note.

The recognition of those types of cases in which the facial nerve and acoustic complications are present should not give rise to difficulty, unless seen after the disappearance of the eruption; even then a retrospective diagnosis might be possible from the character and severity of the initial herpetic pains, and the presence of pigmented scars. I would particularly emphasize the importance of a careful examination of the tympanum, auditory canal, and the recesses of the auricle, as the small patches of vesicles may be concealed and overlooked. The facial palsy occurs with, or follows soon after, the eruption,—auditory symptoms, if present, manifesting themselves about the same time. It should also be borne in mind that symptomatic herpes zoster of the auricle may complicate otitis media and tumors in this region.

PROGNOSIS.—The prognosis in these cases is generally very favorable. The exceptions are the occasional persistence of tinnitus and deafness in the Ménière's type. Residual symptoms of facial palsy may also persist. Very rarely in old people, prolonged and intractable otalgias may continue for a considerable time.

It would seem advisable, as the symptoms are dependent upon hemorrhagic inflammations of the neural structures in the depths of the auditory canal, to leech the mastoid region in all cases as soon as the diagnosis is made, in the hope that this may prevent serious inflammatory invasion of the nerve trunks.

CONCLUDING REMARKS.—The syndrome which I have

outlined, depends for its characteristic features upon the relation of the geniculate ganglion to the seventh and eighth nerves, which are enclosed in a common sheath and course within a narrow bony canal. The syndrome is composed of three distinct groups of cases long recognized and the subject of much discussion. The clinical relation of these groups to one another and their common pathology has not been recognized. In the group with facial palsy, the paralysis was regarded as a rheumatic or toxic neuritis. The same interpretation was given to the group with auditory symptoms. Some idea of the confusion attending the classification of this latter group may be obtained from a perusal of the following list of titles: Polyneuritis cerebialis Ménièreformis (Frankl-Hochwart, 1899, and Berger, 1905); Ueber ein Fall von gleichseitigen, akut aufgetretene Erkrankung des Acusticus, Facialis und Trigeminus (Kaufmann, 1896); Zur Lehre von der peripherischen Facialis Lähmung (Hoffmann, 1899); Beitrag zur Casuistik der multiplen Hirnnerven Erkrankung (Hammerschlag, 1898); Herpes Zoster Oticus (Körner, 1904); Trouble auditive dans le zona (Lannois, 1904).

NOTE—For a full bibliography and discussion, see author's article "On Herpetic Inflammations of the Geniculate Ganglion," *Journal of Nervous and Mental Diseases*, February, 1907; also *The Transactions of the American Neurological Association*, 1906, page 184; and the "Transactions of the Meeting of the New York Neurological Society" held March, 1907, *Journal of Nervous and Mental Diseases*.

EXPLANATION OF TEXT-PLATE.

FIGURE 1. The geniculate ganglion (intumescencia ganglioformis); its relation to the facial and auditory nerves and its communications (Cunningham's Anatomy).

VII., Facial nerve.

P. I., Pars intermedia.

VIII., Auditory nerve.

Aq. Fal., Aqueduct of Fallopius.

G, G, Geniculate ganglion.

ILLUSTRATING DR. HUNT'S ARTICLE ON HERPETIC INFLAMMATIONS OF THE GENICULATE GANGLION.

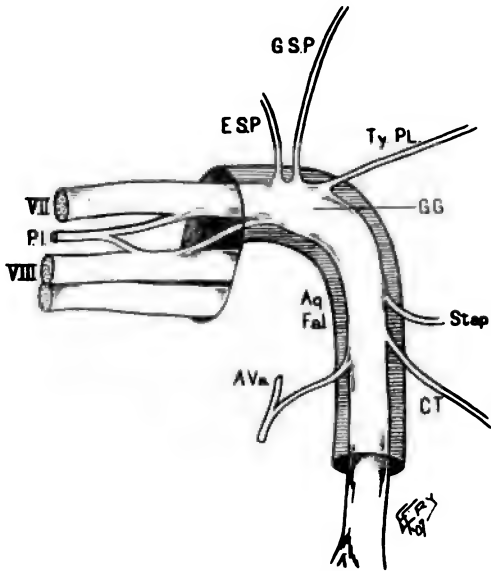


FIG. 1.—The relations of the geniculate ganglion.

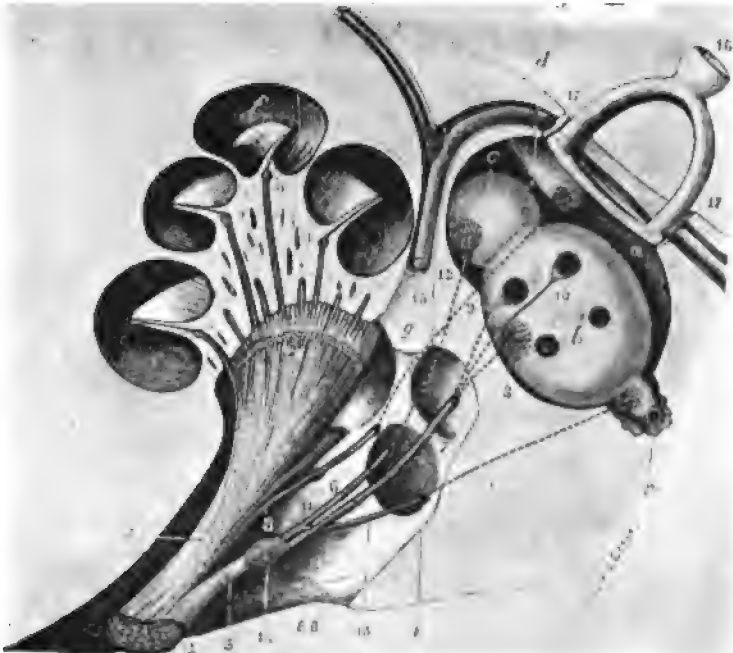


FIG. 2.—The terminations of the auditory nerve.

E. S. P., External superficial petrosal nerve.

G. S. P., Great superficial petrosal nerve.

Ty. Pl., Branch to the tympanic plexus.

FIGURE 2. The ganglia and terminations of the auditory nerve
(Testut's Anatomy).

1. Auditory nerve.
2. Cochlear branch.
3. Vestibular branch.
4. Ganglion of Corti.
6. Ganglion of Boettcher.
14. Ganglion of Scarpa.
15. Facial nerve.

THE DEMONSTRATION OF DISTURBANCES OF EQUILIBRIUM IN ONE-SIDED DISEASE OF THE LABYRINTH.

BY DR. KROTOSCHINER, BRESLAU.

Abridged Translation from the German Edition, *Zeitschr. f. Ohrenheilk.*,
Vol. LI., p. 395, 1906.

FOR the successful treatment of suppurations within the labyrinth it is of great importance to diagnose an infection of the internal ear before we proceed to operation. The involvement of the internal ear is evident in that class of cases which present typical labyrinth symptoms, irritative symptoms on the part of the vestibulo-semicircular canal apparatus (subjective vertigo, objective disturbance of equilibrium, nystagmus) and symptoms of defect on the part of the cochlea (marked deafness or total loss of hearing). There remains a series of cases in which nothing is found before operation to draw attention to a suppuration within the labyrinth, then, either during or after operation on the middle-ear cavities, frequently during an otherwise undisturbed convalescence, distinct signs of an infection of the labyrinth appear. Frequently a beginning meningitis is the first danger signal. After Jansen, Hinsberg has drawn attention to the danger of these so-called latent labyrinth suppurations, and many publications of the last years show how unfortunate it is to overlook the infection of the labyrinth.

The reason for this seems to be that after complete destruction of the labyrinth true irritative symptoms such

as vertigo, etc., are no longer produced, even if the disease extends. Symptoms of defect have not been recognized until recently; their existence seemed probable, for when an organ is destroyed, its function is lost. It was believed that the function of one destroyed semi-circular apparatus could be completely taken over by the healthy apparatus of the other side. Von Stein's investigations have shown that this is not correct. We are to-day able with his methods to show in most cases if a one-sided destruction of the labyrinth has occurred. His publication has shown distinctly that in all cases which he has examined disturbances were present which must be regarded as symptoms of defect.

I had the opportunity of examining a number of cases from the Breslau Ear Clinic according to von Stein's method, where one-sided disease of the labyrinth was present. The results of this examination are briefly as follows:

I. COURSE OF EXAMINATION.

A. Hearing Tests.

As the affection in all of our cases was one-sided, we were able to base our examination on the experiences of Bezold for the determination of one-sided deafness. Edelmann's tuning-forks were used: C₂-C clamped, c-c⁵ unclamped. In the usual manner the relation between the perception of each tuning-fork for the person examined and the normal perception duration was determined.

B. Static Examination on a Horizontal Plane.

We examined the patient standing on his two legs, on his toes, standing on one leg, right, then left. Each test is performed first with open then with closed eyes. It is necessary to note how long the patient can maintain the assumed position, whether he stands quietly

or sways and whether vertigo or other subjective disturbances occur.

C. *Static Examination on an Inclined Plane.*

For this purpose we employed von Stein's apparatus (goniometer). This apparatus is very easy to have made and is not at all expensive. To assure that the patient keeps the vertical position on the goniometer a rule is attached to the patient's back provided with two pendula. The patient is then placed on the apparatus and the movable board is slowly and uniformly raised. The four tests to be performed in this way are: inclinatio anterior, inclinatio posterior, inclinatio lateralis dextra, inclinatio lateralis sinistra. Kümmel has suggested the following terms: deviation back up, front up, healthy side up, affected side up. Each test is to be tried with open and with closed eyes. There are in all eight tests. It is necessary to observe at what angle of inclination the patient examined can remain in a vertical position with his feet close together and his knees touching. To obtain satisfactory results these experiments must be repeatedly made, as it requires some practice for a patient to stand on the goniometer. In normal persons von Stein found, notwithstanding whether the experiments were made with open or closed eyes, the following averages:

Inclinatio anterior	35°-40°
" posterior	26°-30°
" lateralis dextra	} 36°-38°
" " sinistra.....	

We also have examined a number of normal persons and can confirm these results, though we sometimes found with closed eyes a diminution of from 3-4.°

D. *Active Centrifuging.*

Active centrifuging is performed according to Wanner. The person examined must turn ten times to the right

about his own axis and then to the left, with open and with closed eyes. This makes four different experiments. In the normal person, according to Wanner, this results in moderate vertigo, moderate swaying, nystagmus most marked in the direction opposite to the rotation. Sometimes a less marked nystagmus occurs on directing the eyes in the rotation direction, and others present this symptom on looking straight ahead. It seems to make very little difference in this experiment whether the eyes are kept open or closed.

E. Passive Centrifuging.

†

This is performed by means of a rotating disk of about five feet in diameter. The following positions are selected: face to the centre, face to the periphery, forwards and backwards (this while the patient is sitting in a vertical position), horizontal decubitus. The rotation in each case was to the right and to the left with open and with closed eyes. The rapidity of the rotation was such that a complete revolution occurred in five seconds. There were usually five rotations. The normal person under these circumstances suffers from slight vertigo and nystagmus. When the face is directed to the centre the nystagmus is opposite to the rotation; with the face directed to the periphery, the nystagmus is in the direction of rotation; forwards, nystagmus to the centre; backwards, nystagmus to the periphery; horizontal decubitus, no nystagmus. If the centrifuge is suddenly arrested and the eyes are kept closed, there is a sensation of counter-rotation which persists for a few seconds. According to von Stein the normal person with open eyes does not perceive this counter-rotation.

F. Dynamic Examination (Walking and Jumping Tests).

We have carefully examined, according to von Stein's plan, thirty-one different forms of walking, each with

open and with closed eyes. Imprints were made after blackening the soles of the feet of the patient with a mixture of soot and petroleum. The patient was then directed to walk along a strip of paper. The imprints were in many cases very distinct. Von Stein has published a series of these ichnograms in the *Annales des mal. de l'oreille*. This examination is extremely tedious and also very trying for the patient. In order to get reliable results it has to be undertaken in two or three sessions. There are in all sixty-two varieties of gait, walking and jumping, forwards and backwards, on one foot and on the other, with the entire foot or with the toes, turning and jumping.

II. MATERIAL.

We have examined fourteen cases in this extensive manner. Six were patients who had been operated on in the labyrinth. The oval window was enlarged, the promontory partly removed, the lower turn of cochlea destroyed, and a counter opening made in the horizontal canal. We were able in these to assume complete destruction and loss of function in the labyrinth. Two cases were examined before operation. They presented under normal conditions no manifest symptoms except that in the history it was stated that severe vertigo was complained of a long time before. At operation there was marked destruction in the labyrinth. In four cases there was a fistula in the horizontal semicircular canal without demonstrating any further destruction in the labyrinth. In two of these the operation had been performed several years ago. In the other two the patients were examined before operation. In Case XIII. the patient was a girl eight years of age, so that her statements are probably not reliable. At operation a cavity was found which extended to the apex of the pyramid, and we were not able to determine with certainty whether

the labyrinth had been opened. In Case XIV. consent to operation could not be obtained.

III. RESULTS OF EXAMINATION.

The detailed examination of these cases will be found on pages 401-413 of the article in the German edition.

IV. RESUMÉ OF THE RESULTS.

A. Hearing Tests.

In all cases where the labyrinth was destroyed at operation, deafness was present in the operated ear; also in two cases where the presence of extensive disease of the labyrinth was confirmed at operation, which had led to an opening of the labyrinth. In Cases IX. and XI. there was deafness, though at operation only a fistula in the semicircular canal was present. In Case XI. a sequestrum of the cochlea subsequently was discharged. Different is Case X., where a fistula was found in the semicircular canal, and now two years after operation distinct remnants of hearing are present. In Case XII. some hearing could be determined with certainty; a fistula in the semicircular canal was subsequently found at operation.

With Weber's test in cases of deafness the sound is usually transferred to the healthy ear, but not in all cases (IV.). Bone conduction is always abbreviated (Schwabach's test); Rinne's test is always negative on the affected side. Whisper is heard not at all or directly at the ear (IV.). In the cases in which the Lucae-Dennert test was made the results of our hearing tests were confirmed.

B. Static Test on Horizontal Plane.

All cases where the labyrinth is surely destroyed show changes. In Case XII. they were absent. In this case probably, as Hinsberg has shown, there was circumscribed disease in the semicircular canal. In Case XI.

(fistula in the semicircular canal, later cochlear sequestrum) they were absent before operation. They were most easily demonstrated when the patients were asked to stand on their toes with closed eyes as well as on standing on one leg with closed eyes, especially on the leg of the affected side, so that in three cases the experiment could not be performed. In one case the patient was able to stand only with legs spread apart. On approaching the feet the patient falls to one side, even if the eyes are open.

C. Goniometer.

In all cases where the labyrinth has been destroyed by operation there are distinct disturbances which vary in their intensity. In Case XII., where we assume the presence of circumscribed disease, the changes could not be found. The degree of inclination which is supported with the eyes closed is always distinctly less than when the eyes are open.

D. Active Centrifuging.

This could not be carried out in only one patient. In seven marked nystagmus occurred, not only on turning to the right but on turning to the left—that is, turning the eyes to the side opposite to the direction of rotation. In Case II. there was slight nystagmus also on looking in the same direction as the rotation and on looking straight ahead. In one case there was no nystagmus. In one other in turning to the left with closed eyes nystagmus appeared on looking to the right. In Case VII., slight nystagmus in all directions on turning to the right, while in Case VIII. there was moderate nystagmus in all turning of the eyes in every direction. Case XIII. showed moderate nystagmus on looking to the right after being rotated to the right or to the left with open eyes. In a number of cases vertigo set in, especially marked in

Case II., where, consequently, the examination with closed eyes could not be undertaken.

E. Passive Centrifuging.

Of our fourteen cases four could not be examined on the movable disk. Case I., because on the slightest rotation severe vertigo appeared which increased to a stage of nausea; in the other three cases time did not permit us to examine for this particular test. In the other ten cases the nystagmus appeared always in a normal manner. In one case only it seemed to be absent with closed eyes. Vertigo appeared in only three patients, in Case VII. in two tests with closed eyes. The sensation of counter-rotation was present in some cases on turning with the eyes open. In most cases, however, on turning with closed eyes this symptom is very briefly present or absent. It was distinct in two.

F. Dynamic Examination (Walking and Jumping Tests).

In all operative cases (I.-VI.) there were more or less marked disturbances in the walking tests. In five of the cases the tests were well performed with the eyes open; on the other hand, there was distinct disturbance as soon as the test was attempted with closed eyes. In five of the cases the disturbance was marked even while the eyes were open. On closing the eyes in two cases the disturbance was so marked that the rest of the experiment could not be attempted. In Case XIV. marked disturbance appeared with open or closed eyes. No disturbance was present in two cases where at operation a circumscribed disease was found. In Case XI. a sequestrum of the cochlea was subsequently discharged. In all cases where the labyrinth was destroyed at operation, as well as in cases where extensive disease of the labyrinth was confirmed by operation, no vertigo or any other subjective disturbance occurred during the most marked

disturbance of equilibrium. The only exception was Case VII., in which the test with closed eyes produced moderate vertigo. As in these cases vertigo sometimes appears spontaneously, we may assume that the end organs of the nerves had not been completely destroyed. In Case XIV. vertigo appeared with open and closed eyes.

V. COMPARISON OF OUR RESULTS WITH THOSE OF OTHER INVESTIGATORS, WITH CONCLUSIONS ON THE VALUE OF THE VARIOUS TESTS.

Extensive examinations of patients with only one labyrinth have been undertaken by Bezold, Stenger, Wanner, Kümmel, Passow, Noll, von Stein. A short report of these examinations and the ones which we undertook is given in the following.

A. Hearing Tests.

Jansen says that he usually has found, in diseases of the labyrinth on one side, deafness, occasionally hearing remnants (in fistulæ of the canals). These were, however, not exact investigations according to Bezold's method. Bezold always found, in extensive destruction of the labyrinth, deafness. He regards one-sided deafness as the most important symptom of a labyrinth suppuration. Passow found deafness on the side of the ear with the diseased labyrinth. So did Kümmel. Von Stein in one of his patients found hearing remnants, in all the others one-sided deafness. In our cases, as far as they concern patients without labyrinths, we found one-sided deafness. Hearing remnants were present in only one case where at operation a fistula in the semicircular canal was found, and in another case where at the operation subsequently undertaken a fistula was also found in the semicircular canal. In Case XIII. hearing remnants seemed present, but on account of the youth of the patient, the answers were not exact.

Conclusion: In complete destruction of one labyrinth

there is always deafness on that side. There are, however, a number of cases where, notwithstanding symptoms of irritation and defect on the part of the vestibulo-semicircular canal apparatus, and notwithstanding the presence of a fistula in the semicircular canal, more or less hearing has been shown to exist. We may therefore assume that one-sided deafness is an important symptom of labyrinth suppuration, though we should not depend upon the results of the hearing tests exclusively. It is always necessary to search for other labyrinth symptoms with which, together with deafness, a certain diagnosis can be made. From the absence of deafness it is not correct to deduce that a labyrinthine suppuration does not exist. There may be circumscribed disease in the semicircular canal.

B. Static Examination on a Horizontal Plane.

Notes on the standing of patients are to be found in most published cases of labyrinthine disease. Kümmel in his cases found a certain wavering on standing on the toes with closed eyes. The disturbance was more marked when standing on one leg, especially with closed eyes. This author believes that the patient generally is able to stand better on the leg of the sound side than on that of the diseased side. In von Stein's cases no difference was found between the two sides. Our results agree with those of Kümmel. We found in almost all of our cases more or less decided disturbance, so that it gave us some valuable information for the diagnosis.

C. Static Examination on an Oblique Plane (Goniometer).

Kümmel and von Stein also mention their results of examination with the oblique plane. The former, however, states that he could not come to any definite conclusion. Von Stein finds that in all of his cases the angle of inclination is diminished, compared to the normal, more pronouncedly when the eyes are open. He believes

that Kmmel did not arrive at any satisfactory conclusions because he did not pay enough attention to the vertical position of the patient during the test, as he did not make use of the rule which von Stein mentions.

Our cases were examined, according to the description of von Stein, with a rule, and in most of them there was a diminution of the figures. The examination with the goniometer seems to us, in many diseases of the labyrinth, to furnish valuable information.

D. Active Centrifuging.

In the conclusion of his exhaustive paper on nystagmus, Wanner presents the following two theses:

1. In the normal-hearing man the eyes move most when turned in a direction opposite to the rotation, while when directed in the same direction the movement is completely absent or is only very slight.
2. In those with a labyrinthine defect on one side the nystagmus is completely absent on rotation from the healthy to the diseased ear.

The correctness of the first thesis is, of course, self-evident, and we may even regard this form of nystagmus as physiologic. As regards the second thesis, Panse found in his Case III., on rotation towards the diseased ear, nystagmus. A similar condition was observed by Eschweiler and Noll and Passow in three cases. Kmmel mentions that his examinations coincide more or less with those of Wanner, although he observed in three of his cases physiologic nystagmus.

In our material of eight cases with labyrinth defective in function, and in one case where this defect was probably physiologic, nystagmus was present. In only two cases can the phenomenon coincide with Wanner's thesis. In these two cases nystagmus was absent on turning to the diseased ear, and in Case III. it was absent on turning to the healthy ear. In another case

the nystagmus was also absent on turning to the healthy ear when the eyes were kept open, but appeared directly they were closed. One case was very much like Noll's case; nystagmus appeared only on turning to the diseased ear. We see, therefore, that Wanner's thesis is incorrect, and no investigators have been able to confirm his experiences.

The presence or absence of vertigo does not furnish us with definite information. It may be present in one case while in another of exactly similar character it may be absent. That vertigo and nystagmus were absent in the case reported by Klug is not remarkable, as it occurred in a patient with a bilateral labyrinth defect, and this has been observed during the examination of deaf-mutes.

In view of these unsatisfactory results and the severe vertigo which is apt to occur, we think that it will be best in future to leave out this test.

E. Passive Centrifuging.

Though von Stein observed an absence of nystagmus in certain rotations in his cases, nystagmus occurred in all of ours in a normal manner. The cases of Passow and Noll cannot be compared, because passive rotation on a swing produces different conditions than on the rotating disk. Passow found, in one-sided labyrinth defect, nystagmus in a physiologic sense.

Vertigo is usually absent, though it may occur in some cases.

The presence or absence of the sensation of counter-rotation should be investigated. From what has been said, the appearance of this symptom should only be expected on rotation with closed eyes. We, however, found it present a number of times with the eyes open. With the eyes closed, in most of our cases, it appeared for a very brief period or was entirely absent. Von Stein's opinion, that an absence of this sensation of counter-

rotation when the eyes are closed suggests an affection of the labyrinth, seems to be correct. It is striking and difficult to explain why this symptom should appear uniformly in all directions of rotation, although only one labyrinth has lost its function.

The results obtained by this test are not in proportion to the time and trouble expended.

F. Dynamic Test (Walking and Jumping).

Most observers make only a very brief mention of this test, and the simplest experiments only have been tried. Stenger found in his cases, on walking towards a definite point, that there was a tendency to diverge towards the diseased side. Kmmel was not able to obtain any reliable results, though he mentions that jumping on one foot seems extremely difficult. Noll's patient did not show any characteristic symptoms when his gait was tested. The patients who have been thoroughly examined for their gait gave some very interesting observations. In Klug's cases, with twenty-two walking tests, there was a distinct deviation from the original direction. In von Stein's cases these tests also showed distinct abnormalities. Our cases where the labyrinth was defective on one side also presented distinct disturbances of gait. We can, therefore, confirm von Stein's deduction, that a suppuration in the labyrinth is always associated with disturbances of equilibrium during movements; these disturbances are most marked on jumping with closed eyes. In most cases the disturbances are unaccompanied by vertigo or other subjective symptoms. They can be explained by the defect of the function of one labyrinth.

These defect symptoms seem to be as important for the diagnosis of one-sided labyrinth destruction as the well-known irritative symptoms.

One must be careful not to make the diagnosis of a

suppuration in the labyrinth simply from the negative result of the functional examination. Similar conditions may be caused by labyrinth diseases of other nature. We saw these symptoms occur in traumatic lesions of the internal ear and in a hysterical girl. Von Stein has mentioned cases of this character where the symptoms followed a trauma.

In order to confirm the diagnosis of suppuration of the labyrinth we must be extremely careful to observe the condition of the labyrinth wall during the operation on the middle ear.

VI. PRACTICAL DEDUCTIONS.

The danger of a non-recognized suppuration in the labyrinth makes it desirable that there should be methods by which a nearly exact picture of the functional disturbances of the labyrinth can be obtained. A number of tests and methods of examination have been recommended for this purpose. These consist in: examination of the hearing, static examination on horizontal and oblique planes (goniometer), active and passive centrifuging, dynamic tests (walking and jumping). In our experience, it is impossible to apply all these tests in each case of suspected labyrinth suppuration, as they not only require a large amount of time, but are too trying for the patient. They are, moreover, not all necessary, because they are not all equally reliable.

Those which are the most reliable and which are applicable to most cases, and sufficient generally to make a diagnosis of one-sided disturbance of the labyrinth, are as follows:

1. **Hearing Tests.** If possible, the construction of a hearing relief. If an extensive hearing test cannot be made, it should be determined whether on the diseased side forks from a' down are not perceived (Bezold), and the Lucae-Dennert test should be applied. Most records

of labyrinth diseases which have been published do not satisfy these conditions, and it is not possible to determine with certainty whether one-sided deafness is present. (This examination lasts about half an hour.)

2. Static Examination on a Horizontal Plane. Two-leg position, toe position, standing on the right leg, standing on the left leg; bending the trunk forward, backward, right and left.

The static examination can be easily performed, and, though the results are not always definite, they are of advantage.

3. Dynamic Examination (Walking and Jumping). The preceding observations have shown that disturbances of equilibrium are usually most evident on jumping backward with closed eyes. It is, therefore, proper that we should begin with this test. If this test is passed without showing any disturbance, extensive disease of the labyrinth is improbable. It is in most cases desirable to try the various tests of von Stein at least with closed eyes, because they usually furnish some information on the degree of disturbance. All of the sixty-two tests require about an hour, the more important ones about half an hour. On the graphic notation of the imprints the duration of the test is increased to three hours.

4. Examination with the goniometer gives us such remarkable results that it should be performed when possible, although we cannot as yet say that it gives us definite information for diagnosis.

5. Centrifuging has thus far not given us any definite results, and this test can be discarded for practical purposes. To advance our knowledge of the labyrinth function, however, the tests should be tried when it is possible to make use of them.

We have recently obtained the "plegometer" of von Stein; we have not been able to obtain any practical results, and shall report on this test at some future time.

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HYPERTROPHIC NASAL CATARRH AND COMPLICATIONS, WITH CLINICAL ILLUSTRATIONS.¹

By CHARLES AUBREY BUCKLIN, M.A., M.D., NEW YORK.

HAVING operated on 31,181 cases since my invention of the nasal saw in 1880, I feel entitled to express my opinions upon this subject.

Hypertrophic nasal catarrh is occasioned by obstructions to nasal inspirations.

The vacuum formed within the entire respiratory tract with each forcible nasal inspiration amounts in the case of patients suffering from this disease to about one and thirty-six-hundredths pounds to the square inch.

With this vacuum reduced to about one half, the symptoms of catarrhal diseases and their complications frequently cease to exist within ten days. It has been demonstrated that with one half of these obstructions to nasal inspiration removed the amount of oxygen inspired has always been doubled.

It has been shown that the atmospheric relations between external and internal pressures have been changed to those that would have been experienced by changing the patient's residence to an altitude of about three miles above his present residence.

The atmospheric relations which exist before and after treatment can easily be demonstrated and com-

¹Read upon invitation of the Massachusetts Medical Society, Berkshire District.

pared. This experiment always makes a favorable showing for this method of treatment.

The above conclusions can all be clearly demonstrated by experimenting with the "Respirometer" and "Displacement Vessels." The "Respirometer" consists of a glass tube four feet in length and three-eighths of an inch in diameter with a bore of about one-eighth of an inch in diameter. An opening is formed through this tube at one inch from the lower end, one-eighth of an inch in diameter, at right angles to the bore of the tube. This opening is for the purpose of admitting water freely in all positions of the tube. A rubber band is placed around the tube at the height to which water would rise in the tube when it is immersed in a glass of water. Another band is fitted with its lower edge thirty inches above the first band. When the tube is in use one must quickly notice the point above or below the lower edge of the second band to which water is raised and measure the distance.

A third band of rubber is placed on this tube, the upper margin of which is three inches from the upper end of the tube. These upper three inches of this tube are placed in the mouth of the patient who is being examined.

A clean glass of water is used in which the lower end of this tube is kept immersed when an examination is to be made. With the above conditions complied with, we are ready to answer the above indicated questions when the patient has taken a long, rapid, and forcible inspiration through the nose while the tube is held air-tight in the mouth.

The measurement of the height to which water is raised in the tube will enable one to conclude how great a vacuum the patient forms in the respiratory tract with each forcible inspiration.

The differences between the openings in the nostrils can be readily estimated by closing one of them with the finger during a full nasal inspiration.

The narrower nostril will cause water to rise higher in the

tube. The water will be raised higher in the tube when the inspiration is done through nostrils that have been pathologically obstructed. When the obstruction is from adenoids, the water will be raised higher than would be the case after they have been removed. There will not be any decided difference in the height to which water is raised in the tube by obstructing one nostril with the finger. In obstructions of this kind when a difference is noticed to exist it must be sought for in the pathological condition of the nostril. With a large number of persons who were afflicted with hypertrophic catarrh not complicated with pulmonary tuberculosis upon whom I have experimented as to the height to which they could raise water in this tube, it has been raised to thirty-six inches or more. In persons afflicted with pulmonary tuberculosis I have found only eight per cent. who did not require this operation for the cure of the catarrhal element of their diseases.

To make the physics plain regarding the changing of the differential atmospheric relations, consider every patient examined as a suction pump. To whatever height a patient can raise water in the "Respirometer," if you place this individual under a glass receiver and reduce the atmospheric pressure to one half with an air pump at the sea level, the pressure will be seven and one-half pounds, which experience has taught is equal to the pressure at an elevation of three miles. The patient with this reduction of pressure to one-half will be able to raise water during a deep nasal inspiration only to one-half the height he formerly raised the water in this instrument.

It makes no difference whether the patient's ability to raise water in the "Respirometer" is influenced by rare air or by larger openings through the nostrils. The differences between the atmospheric pressures have been largely compensated for, and this one element will greatly improve his catarrhal disease whether he be afflicted with

pulmonary tuberculosis or any of the numerous catarrhal complications.

If a person afflicted with pulmonary tuberculosis be so weakened by his disease that he can raise the water only six inches in the "Respirometer," and he has visible obstructions in his nose, the removal of a turbinated bone will so reduce his ability to raise water that he can raise it only three inches, which is the same improvement as in the case of the patient who could have raised the water to thirty-six inches and who had his ability reduced to raising it eighteen inches. The equalization of the internal and external pressures is in every case the same factor for which we are striving. One-half of the number of inches to which a patient can raise water in the "Respirometer" is used as a divisor to divide 15,840 feet, or three miles reduced to feet, for the purpose of showing for each patient the number of feet of elevation which corresponds to every inch by which the level of water he can raise in this instrument has been lowered.

I find reduction by this method of the relations between external and internal pressures more beneficial for the treatment of pulmonary tuberculosis or catarrhal diseases of the respiratory tract than the same reduction would have been as a result of a residence at a higher altitude. The elevation of tubercular patients to a decidedly higher altitude causes them to develop unpleasant pulmonary symptoms.

Not more than four attempts should be made to raise water in the "Respirometer" at any given trial, as the patient becomes fatigued. A time should be selected for this experiment when the patient is not tired. The complications of hypertrophic nasal catarrh are chronic catarrhal diseases of the entire respiratory tract and the accessory sinuses, obstructed nostrils, asthma, hay fever, catarrhal otitis media, chronic lachrymal disease, and pulmonary tuberculosis.

Pulmonary tuberculosis is placed as a complication

because it is exceptional for tubercle bacilli to infect lungs that are not affected with chronic catarrhal diseases. It can happen, and I know from experiments made in the Pathological Institute at Munich while I was a student there in 1877. This was before the tubercle bacilli had been discovered. Several animals that did not have chronic bronchial catarrh were infected by Prof. Bull and died during this year of pulmonary tuberculosis.

Physicians will generally support me in the following statements. While it is usual for persons to be affected with chronic catarrh this is not a necessary condition for their infection with tubercle bacilli. The infection having taken place, their lungs are immediately attacked with chronic bronchial catarrh, by means of which the patient's life is usually brought to an end. It therefore becomes an important disease to cure in these patients. Pulmonary tuberculosis can usually be cured in about nine months, with a less number of complications, after this operation has been performed for the removal of nasal obstructions. This is accomplished by increasing the diet gradually of the female to four quarts of milk daily and the male to a diet of five quarts of milk daily.

One-half to one ounce of fresh castor or olive oil is given in hot black coffee or in any other desirable way before retiring every night. The oil is necessary to clear out the alimentary canal so that this increased diet may be continued.

Either the above increase in diet or an equivalent increase must be made, or this disease will not be cured.

The cure of asthma, hay fever, catarrhal otitis media, and chronic bronchitis can usually be produced in three months. "Catarrhal otitis media" can usually be cured up to the twentieth year of the patient's life; the hearing is greatly improved up to the thirtieth year; after this date the prognosis is bad. With proper conduction the cure can, however, be promised at any period of life. No additional treatment is necessary after the operation

excepting inflation according to the "Valsalva method"—which consists in holding the nose air-tight with the fingers, taking a long inspiration, closing the mouth, and blowing as hard as possible until the ears are felt by the patient to expand.

DISINFECTION OF THE "RESPIROMETER."

This is accomplished by allowing the glass tube always to stand immersed in a solution of corrosive sublimate of 1 to 250. This solution is held in a galvanized iron pipe, four feet in length and three quarters of an inch in diameter. The two ends of this pipe are closed by caps containing soft-rubber plugs, one end having the cap so loosely fitted that it can be adjusted with the fingers. Thus closed, the tube holds the solution securely during transportation. The glass tube is always used wet. This prevents the salts of mercury from depositing a dirty-looking coating upon it. It presents to tubercle bacilli an instrument covered with a strong disinfecting solution upon which, should they fall, they will be destroyed.

There is certainly no chance of any one becoming infected with pulmonary tuberculosis through the use of this instrument. I have tried mercury in the place of water, and on account of the discouraging prospect of infection I have abandoned it. The displacement vessels also offer some additional elements of proof to the above statements. They consist of two graduated vessels holding one gallon each. The openings of both are stopped with large rubber corks, through each of which is conducted in an air-tight manner one arm of a U-shaped piece of galvanized iron pipe with an opening of three quarters of an inch, which is carried down to one quarter of an inch of the bottom of one vessel and in the other to the lowest point possible at which it will not act as a syphon. Another short tube is passed through

each cork air-tightly. This tube in the cork containing the longer arm is connected with a piece of rubber tubing eighteen inches in length. This vessel is filled with water. Patients are requested by a quick nasal inspiration to fill their lungs and then to blow on the rubber tube as long as they can. This will enable the average individual to displace about forty-eight ounces of water, which is measured by the graduations as it is displaced.

Remove the nasal deformities and the most prominent lower turbinated bone from the nostrils, and the same patient will displace ninety-six ounces of water. This is about the capacity of the average lungs. One can readily demonstrate with this apparatus that the ability to inhale oxygen has been doubled by these nasal operations. The entire amount of air which can be inspired with each inspiration can be determined. This is of value in making a final prognosis.

Neither of these instruments is necessary to the practitioner. They are necessary, however, for the development of the theory which led to the invention and support of these nasal operations. They are also necessary if any one desires to show the altitude to which the operation has changed the atmospheric relations of the patient operated upon.

TREATMENT.

Before attempting to operate in the nose, the parts should be thoroughly brought under the influence of a solution of cocaine, twenty per cent., ounce one, combined with a solution of adrenalin 1 to 1000, drachm one. This will make the operation painless and bloodless, and will enable one to operate under a general anæsthetic when necessary. If cocaine is used for a local anæsthetic, it must not be forgotten that the anæsthetic properties of this drug can be entirely destroyed by boiling twice. There are other local anæsthetics that are not destroyed

by boiling. The local anæsthetic used is best applied with a ladies' hat-pin, the point of which has been slightly roughened with a file. Absorbent cotton can be wound about this loosely for one inch and is immersed into the local anæsthetic used. Then two long immersed cotton plugs are pressed into the nostril, one on each side of the turbinated bone which is to be removed. The hat pin is twisted in the reverse way from which it is wound, and these pieces of cotton are allowed to remain in position for fifteen minutes, when the anæsthesia will be complete. These pieces of cotton are displaced by a sharp right-angled hook; the length of the hooked portion is about one sixteenth of an inch. The hook is passed flatwise to one side of these pieces of cotton, then the entire instrument is rotated and the hook engages the cotton, which is withdrawn.

These desired results are accomplished by removing all of the nasal deformities, with an additional proper removal of the most prominent lower turbinated bone which has been misplaced or diseased. The posterior extremity of the turbinated bone should always be removed. The judgment of the operator must decide how much of the anterior end of the turbinated bone requires removal for the relief of the nasal obstruction.

The teeth of the saw should be placed under and to the outside of the turbinated bone. These teeth should point upward and inward at an angle of 45° from the vertical. In this direction the bone should be sawed through.

These operations will cause the general health of the average patients having pulmonary tuberculosis to improve sufficiently to produce for them a gain of ten pounds during the first four days.

The proper removal of the most prominent lower turbinated bone is never omitted when it is necessary to reduce the water raised in the "Respirometer" to one

half the distance it was raised before the treatment was commenced.

Since 1880 the patients who have been treated by these operations have all been ambulatory patients.

Francke H. Bosworth in 1886 read a paper before the New York Academy of Medicine in which he acknowledged that priority belonged to me for having used the nasal saw first. The report of this paper may be seen with his signature in the *New York Medical Record* of January 29, 1887.

The saw referred to was a jeweller's saw number ten, covered at the outer end with solder so that it would not scratch. The necessary stiffness was supplied by enclosing it in a sheet of German silver. Only two and one half inches of the saw teeth were left free to cut. It was clamped in a pin vice so that it would cut upon withdrawal only. After having experimented since 1880 with every saw that has appeared I am obliged to return to the original principle involved in my first saw, which cuts upon withdrawal only. My saw of to-day is three inches long with twenty teeth to the inch, which are so set that they cut upon withdrawal only. The saw used by the butcher is the model for forming the teeth.

In the winter of 1906 I removed a turbinated bone from a man of fifty years of age at a hospital in Berlin in exactly five seconds.

The bone may conveniently be seized by stout artery forceps and easily removed, although slightly adherent after the operation. Hanging mucous membrane left after the operation should be removed by scissors immediately. The complication which usually follows the removal of a turbinated bone is secondary hemorrhage. This is overcome by dismissing every patient operated upon with a stout nasal spray and one ounce of a solution of adrenalin 1 to 10,000 strong, with which he is instructed to spray the nostril thoroughly should he experience any hemorrhage.

The only confirmation that I have of the above ideas is my large personal experience, taken with an article by E. H. Griffin published in the *New York Medical Record* on April 14, 1906, under the title "Turbinectomy." The author has operated ten thousand times. He states: "If I were to summon up from all the various operations that are resorted to in order to correct nasal obstruction the one that will give most permanent relief, I would without hesitancy name partial turbinectomy."

There has not been an unsatisfactory result from any of his operations. He has seen patients gain from ten to eighty pounds within six months after the operation. The cures of asthma, hay fever, and a case of catarrhal otitis which had deprived the patient of his hearing for years were effected so that the patient could hear his watch at two feet. These are among the cases reported by him which offer satisfactory confirmation of the ideas which I offer in this paper.

I have selected from my large clinical experience cases which illustrate every special claim in this essay, which I herewith publish:

CLINICAL ILLUSTRATIONS.

Case No. 1., M.P., age 27 years. He has had the disease three years and has consulted several specialists regarding it, without any beneficial results. He consulted me August 4, 1903. Weight 113 pounds. He raised water in the "Respirometer" to thirty inches. I removed the turbinated bone from the right nostril, after which he could not raise the water to more than twelve inches. This changed his differential atmospheric relations to an elevation of three and six tenths miles. He showed tubercle bacilli in his sputum.

His cough almost ceased within two weeks. He has followed his trade, supporting a wife and three children. His weight has increased to 149 pounds, making a gain of thirty-six pounds. This patient could displace double the quantity of water from the displacement vessel after the operation.

On June 1, 1904, the tubercle bacilli had disappeared. There is no cavity in his lungs and there is every evidence that he has been cured of pulmonary tuberculosis. This case demonstrates the fact that cases of this disease without any cavities in their lungs lose their tubercle bacilli in nine months or thereabouts, provided that their appetites are good.

Case No. 2. W. M., age 44; disease acquired fifteen years ago. Has had twenty-five hemorrhages. Applied November 6, 1902, for relief from a distressing cough and laborious breathing. He had a large cavity in his right lung, with infiltration throughout his left lung. He appeared very much like a dying man. In the left nostril he had ample breathing room. In the right nostril the lower turbinated bone was swollen and passed nearly through the middle of the nostril.

I tried him with the "Respirometer" and he raised water to thirty inches. He accepted my proposition to remove the lower turbinated bone from the right nostril. After the removal he could not raise water in the "Respirometer" to more than three inches. This showed an alteration in his differential atmospheric relations equal to the change he would have experienced had he changed his altitude to an elevation of five and four-tenths of a mile.

His bronchitis ceased annoying him after one week. On March 24th he had gained twenty-two pounds. The first examination of sputum showed tubercle bacilli. The next five examinations failed to show their existence. The seventh examination, made in October, 1903, showed them to be present again.

This patient could displace double the quantity of water from the displacement vessel after the operation.

He has been able to follow his usual vocation, which is that of a builder. He considers himself cured of pulmonary tuberculosis. Occasional tubercle bacilli are still found, which is the only reason why I cannot pronounce his disease cured.

If his appetite were good and he could have taken the same amount of nourishment as Case No. 1 took, I believe, as the result of my experience, that, notwithstanding the compli-

cations which are present, he would also have recovered entirely in nine months from his pulmonary tuberculosis.

These two cases of pulmonary tuberculosis, one taken from my successful list and one taken from my unsuccessful list, complete my illustrations regarding the cure of this disease.

Case No. 3. Mrs. S., age 24 years. Had a chronic bronchitis and catarrhal laryngitis from which she had suffered for two years. She had consulted many physicians regarding her disease, without any relief. Weight was 150 pounds. She did not show tubercle bacilli. She was constantly acquiring additional attacks of bronchitis complicated with cough and hoarseness. She thought that she had pulmonary tuberculosis. I removed the most prominent lower turbinated bone. She could immediately displace double the quantity of water from the displacement vessel. The cure was complete within two weeks. She can now ride on an open car without developing laryngitis or bronchitis, which she could not have done before this operation.

Case No. 4. G. W. P. He has suffered from hypertrophic nasal catarrh for four years. He has consulted specialists all over the country, without any benefit. He was frequently advised against submitting to any operation. He has never found in winter a temperature that is exactly suited to him. The air appears to have pepper slightly distributed through it. He could not tolerate artificial heat in a room. The discharge from his nostrils was profuse and annoying. Catarrhal deafness was a complication which developed in his left ear, which reduced his hearing 50 per cent. in this ear. I removed on September 25, 1904, the lower turbinated bone from his right nostril. In one week every annoying symptom had disappeared. He displaced double the quantity of water from the displacement vessel after the operation.

Case No. 5. Miss F., age 14 years. She had attacks of suppurative disease in the right middle ear for years. Has catarrhal disease in the left middle ear. Right ear heard a watch at one inch. Left ear heard a watch at three inches. These measurements were made after inflation. The defects in her nasal passages and naso-pharynx which caused the deafness were a deformity of the septum and a

misplaced lower turbinated bone in the right nostril, with the naso-pharynx filled with adenoids.

She had consulted specialists in New York, who had tried to relieve her nasal obstructions by repeatedly using electric cautery and caustics. The entire surface of the turbinated bone and the adjacent surface of the septal deformity were left denuded of their mucous membranes as a result of these operations. They were consequently firmly adherent in the right nostril. The deformity of the septum was removed by the saw, which left it attached to the turbinated bone. The saw was next introduced under and to the outside of the turbinated bone, which was bisected, at an angle from the vertical inward of 45° . This obstruction when removed from the nostril consisted of the septal deformity firmly attached to the turbinated bone. The adenoids were all removed. The hearing, without any other treatment, within one month was found to be as follows:

Right ear heard watch at twenty-five inches. Left ear heard watch at forty inches. She has never had any further trouble with her ear. This case was treated in 1890.

Case No. 6. J. McC., age 30 years; catarrhal deafness, which had been developing for ten years. He had consulted the most prominent specialists in New York and received from every one of them a hopeless prognosis. He could only hear my conversation through a rubber speaking-tube. In September, 1901, the deformed turbinated bone was removed from his nostril. He could displace double the quantity of water in the displacement vessel after this operation.

He says he commenced to improve within one month. I saw him at the end of three months and he had no difficulty in carrying on an ordinary conversation with me. He is decidedly fleshier.

Case No. 7. J. McW. He had suppurative lachrymal disease. I removed a hypertrophied lower turbinated bone for the cure of this disease. The result was a perfect success. The patient immediately after this operation was incredulous of this method of treating an eye disease and he consequently consulted Prof. H. Knapp about this operation. He was told that the method of treating this disease was originated by

Bucklin. He was, however, pleased to see an eye disease that had been so perfectly cured by a means he had never known about.

All claims made in this essay regarding the means of curing diseases by removing the obstructions to nasal inspirations have been especially illustrated. The cases have been fairly selected from a large number of cases which have passed under my observation.

I believe mine is the most reasonable method to employ in relieving hypertrophic catarrh, even if the case be complicated with an infection of tubercle bacilli.

A rapid introduction of this method of treatment depends upon the assistance of the medical profession.

Should any physician desire to observe the practical benefits which can be produced in any of these complications by these operations he should call on the author of this paper for proofs.

The details of the operations will be cheerfully shown and their beneficial results will be demonstrated.

REPORT OF A CASE OF DIPHTHERIA, COMPLICATED BY ACUTE PURULENT OTITIS MEDIA, MASTOIDITIS, AND INFECTIVE SINUS THROMBOSIS.¹

By PHILIP D. KERRISON, M.D., NEW YORK.

(With temperature chart in the text.)

Kate Shelban, nineteen years of age, and a native of Poland, was admitted to the Willard Parker Hospital on January 12th, suffering from diphtheria. The high temperature on admission, *i. e.*, 104.8°, led to a thorough physical examination. The heart and lungs were normal. There was no rash. The ears were normal. Examination of the throat revealed enlargement and congestion of both tonsils, with slight membranous exudate confined to the right tonsil.

During the three days following her admission, the temperature described wide variations between 98° and 103°, reaching and remaining normal during the fourth and fifth days. On the sixth day, January 18th, the right drum-membrane was seen to be red and bulging, and was incised by the resident physician under chloroform anæsthesia. There was at this time no mastoid tenderness. On January 21st, the temperature rose to 102.4°, and distinct mastoid tenderness developed. On January 24th, physical signs of acute mastoiditis were unmistakably present. Examination of the blood revealed a leucocyte count of 15,000,—a differential count unfortunately not having been made. Mastoidectomy was performed under chloroform anæsthesia.

¹ Read before the Otological Section of the N. Y. Academy of Medicine, April 12, 1907.

The antrum and mastoid cells contained pus and granulation tissue. Pus taken from the antrum was found to contain only the staphylococcus albus. The tip and zygomatic cells were removed and the operation completed after the usual method. Owing to the rather suspicious temperature curve, the vertical limb of the sigmoid sinus was exposed over about $\frac{1}{4}$ of an inch. The sinus wall was perfectly normal in appearance. During the week following the operation the temperature gradually returned to the normal, and the patient's condition seemed improved.

On February 1st, eight days after the operation, there was a rather abrupt rise of temperature from 99° at mid-day to 105° at 8 P.M.

On the following day the temperature was still 105° . Examination of the wound revealed a considerable pocket of pus below the mastoid wound, which it was thought might account for the temperature. This was freely opened under chloroform anæsthesia, fully a drachm of pus being evacuated. During the four days following this procedure, the temperature continued to suggest septic absorption, and the patient became progressively more septic in appearance.

On February 4th, the leucocyte count had fallen to 12,000, with polymorpho-nuclearphiles count showing 64 %. The eyes were examined by Dr. Wootton and found normal.

On February 5th, it was decided to explore the interior of the sinus. The sinus was therefore farther exposed upward and backward slightly beyond the knee, and downward in the direction of the bulb. On opening the vessel free hemorrhage occurred from the torcular end, but none from below. A curette introduced downward and inward into the horizontal limb dislodged a well organized clot about one-third of an inch long. Only moderate hemorrhage followed its removal. Preparations for removing the jugular vein were stopped by the anæsthetist who thought that the pulse indicated cardiac failure.

Two days later—i. e., on February 7th, the patient being evidently more septic, she was again placed under the influence of an anæsthetic, and the jugular vein removed from a point a little above the clavicle to a point above the entrance of the facial vein. Following this operation the

temperature gradually fell to normal and remained so, recovery being slow but uneventful.

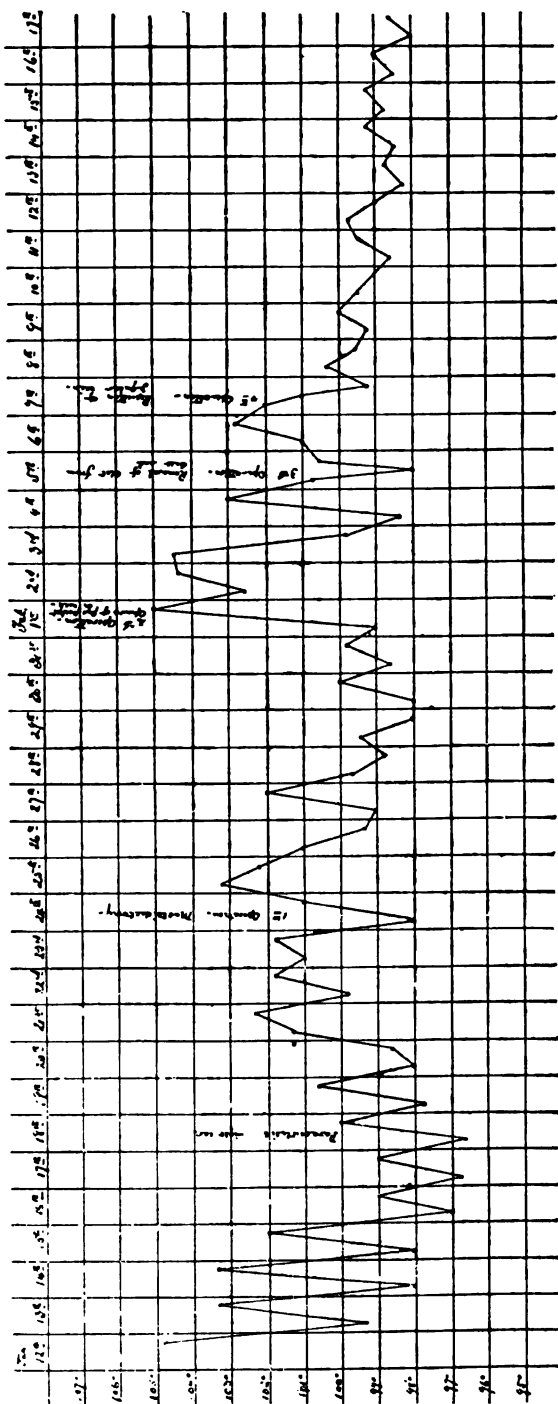
From the character of the temperature curve and the appearance of the patient at the time of the first operation, the writer is inclined to believe that the formation of the clot in or near the bulb occurred in this case as a very early phenomenon,—possibly as early as the time of the first operation.

A point not covered in the literature dealing with the management of these cases is the means by which we may determine the presence of a parietal or non-obliterating clot in the bulb or inner end of the horizontal limb of the sigmoid sinus in cases of suspected sinus thrombosis. The writer is under the impression that there is in reality no safe and practical means of determining the presence of such a clot even at the time of operation. This difficulty suggests two questions, viz:

1. In cases of suspected sinus thrombosis, in which no urgent need of immediate intervention is apparent, may not a reasonable delay in operating be advisable for the purpose of allowing a beginning clot to reach a stage of development more certainly demonstrable?

2. In cases in which septic absorption is in progress, and in which every reasonable care has been observed to exclude sources of infection outside of the sinus or bulb, may it not be wise, even though no demonstrable clot is revealed on opening the sinus, to resect the jugular vein, thus eliminating more positively this avenue of infection?

N. B.—The accompanying temperature chart gives simply the highest and lowest temperatures recorded each day.



Temperature Chart to accompany Dr. Kerrison's Report of a Case of Diphtheria with Otitic Complications.

OTITIC MENINGITIS.¹

BY DR. ARNOLD KNAPP, NEW YORK.

Statistics: Recent statistics² have shown that uncomplicated otitic meningitis occurs as often after acute as after chronic purulent otitis.

In twenty-nine out of fifty-two cases, meningitis followed disease of bone, extending to the dura, which was involved to a varying extent. The diseased bone was situated in eleven at the tegmen of the antrum and tympanum; in sixteen, at the posterior surface, the superior edge, or the apex of the petrous pyramid; in twenty-two the infection extended through the labyrinth, generally along the internal auditory meatus. In a few the path of extension could not be determined.

These figures show that the meninges are first infected, in nearly three-fourths of the cases, in the posterior cranial fossa, and in slightly over one-fourth of the cases in the middle cranial fossa. A proper appreciation of this localization of the beginning meningeal infection is important in considering the possibility of operative treatment.

Forms of Meningitis: In certain cases where the infective process stops short of traversing the dura or remains in the labyrinth, symptoms of meningitis supervene, characterized by an increase of cerebro-spinal fluid

¹ Read at conjoined meeting of Sections on Otology and Rhinology of the N. Y. Acad. of Med., May 29, 1907.

² Heine: *A. f. O.*, vol. 50, p. 272, 1900.

and consequent increase of intracranial pressure. Lumbar puncture reveals clear sterile fluid under pressure. Removal of the primary focus in the temporal bone and release of the accumulated fluid are rapidly followed by recovery. This variety is termed serous meningitis or, according to Koerner, serous meningo-encephalitis. Pathologically it is explained as collateral oedema of the subarachnoid space in the proximity of a purulent focus.

If the infective process succeeds in perforating the dura according to the variety or rapidity of infection, the meningeal membranes may become agglutinated; an encapsulated intrameningeal abscess is formed. There may be superficial involvement of the brain substance or a brain abscess. Some of the symptoms of meningitis are present. The puncture fluid is clear or moderately clouded and may contain bacteria. If the walling-off of the intrameningeal process is incomplete, leakage takes place; the infection disseminates and the meningitis becomes general.

Finally there is the condition where no encapsulation of the infective process occurs, the infection rapidly extends throughout the entire arachnoid cavity, and general purulent meningitis is present. Lumbar puncture evacuates a distinctly purulent, bacterial fluid.

The classification of purulent meningitis into encapsulated, acute progressive, and general, is the one suggested by Heine.¹

It is adapted from the classification of peritonitis of the general surgeons. The labyrinth is frequently an intermediary in the progress of the infection of the meninges. The anatomical conditions at the internal auditory meatus are not favorable for the encapsulation of the purulent process in the meninges, and general meningitis most frequently results.

Symptoms: As for the symptoms of meningitis, no

¹ Heine: *D. m. W.*, 1906, No. 4.

single symptom is characteristic. The diagnosis is frequently very difficult unless a number of symptoms simultaneously appear. Kernig's sign is perhaps the most constant. Schwartz, many years ago, stated that the diagnosis could not be definitely made until marked sensory disturbance, with clonic and tonic spasms of the extremities, was present.

Lumbar puncture is unquestionably a great aid in diagnosis. The degree of purulency of the fluid and the kind of bacteria present furnish valuable information on the existing variety of meningitis and the character of the infection. The findings are, however, not infallible. Thus Brieger¹ reported a case of brain abscess with fistula into the ventricles but without purulent meningitis where the spinal fluid contained bacteria, and Voss² found a similar state of the spinal fluid in a case of sinus thrombosis.

As many cases of meningeal infection begin in the posterior cranial fossa, rigidity of neck and symptoms of spinal meningitis, pain in the back and rectum, painful defecation, incontinence of urine and faeces, are first observed.

Prognosis: The prognosis of purulent meningitis is unfavorable, in fact until the last few years the outcome was regarded as absolutely fatal. Then cases were reported where purulent meningitis was cured by eliminating the primary focus and by repeated lumbar puncture. Macewen, Jansen, and Lucae have all reported cases of otitic meningitis successfully operated upon where circumscribed purulent collections within the dura were drained. Hinsberg³ has been able to add seven cures and five cases of marked though only temporary improvement after drainage of the subarachnoid cavity.

¹ Quoted by Heine, *Operationen am Ohr*, 2d ed., Karger, Berlin, 1906.

² *l. c.*, Heine, p. 186.

³ Hinsberg, "Operative Treatment of Meningitis." *These ARCHIVES*, vol. xxxv., No. 5.

A remarkable case was that of Kuemmel,¹ a general surgeon in Hamburg, of which the following is a brief synopsis:

After an injury to the back of the head, the patient, a man thirty-three years old, was unconscious for two days and cerebro-spinal fluid escaped from the nose. He then complained of headache, vertigo, tinnitus, and deafness in the right ear; he became stuporous, with rigid neck, strabismus, and temperature of 102.6°. Lumbar puncture evacuated thick purulent fluid. The patient appeared to be moribund, and without anæsthesia two trephine openings, each as large as a silver dollar, were made on both sides of the occipital bone near the junction with the parietal bones. The dura was excised in this area; the arachnoid appeared cloudy and congested; a moderate quantity of purulent fluid escaped. Gauze tampons were introduced in both openings. The patient's condition improved from the next day and all the symptoms disappeared in six weeks.

Held and Kopetzky² recently reported a successful operation for otitic meningitis.

The patient, a child three years old, was operated upon for chronic purulent otitis. The tegmen over antrum and aditus was absent, and the dura in this area was covered with dark granulations. Two months later symptoms of meningitis developed. The spinal fluid was purulent and contained diplococci. An opening was made through the squama, the dura was incised and purulent fluid escaped. Gauze was introduced between the base of the temporal lobe and dura. Subsequently the lateral ventricle was punctured and lumbar puncture was repeatedly performed. This desperate case recovered completely.

Heine considers the circumscribed and acute progressive varieties of purulent meningitis as curable, but the prognosis in the general type as absolutely bad. In the last the spinal fluid is nearly pure pus and contains

¹ Hinsberg, *l. c.*

² These *ARCHIVES*, vol. xxxv., No. 6, 1906.

bacteria; operation can accomplish nothing. At the Halle Ear Clinic an operation is not undertaken when the spinal puncture fluid is purulent and contains bacteria, and an operation under these circumstances is considered an error in judgment. Systematic writers regard cases of successful operation for otitic purulent meningitis as belonging to the acute progressive type even if the liquor contained bacteria and was purulent. It seems to me of very little practical importance how we classify these cases, as the variety of meningitis must sometimes depend upon the personal opinion of the surgeon as to the degree of purulency of the spinal fluid. Spinal puncture is of great importance as an aid to diagnosis and for prognosis, but the question of operation, it seems to me, should depend on other factors which are individual in each case, such as the patient's condition, the nature of the ear trouble, the findings at previous operation, etc.

Operative Treatment: Ballance¹ says that the main surgical indication is the removal of the local disease, and this surely should have been carried out before the meningitis had arisen. For general suppurative meningitis, according to this author, the indications for treatment are to suppress the source of infection, to give free exit to the suppurative exudation, and to combat the disease with the appropriate antitoxin. Friedrich² was one of the first to urge active operative measures in the treatment of meningitis. He suggested incision of the dura at the site of infection and making a counter-opening in the spine by laminectomy for drainage.

The prospect of successfully dealing with the localized intrameningeal infection depends somewhat on which fossa is first invaded. The broad exposure of the infected meningeal area if it is situated in the middle cranial fossa is simple; in all successful cases the operation was

¹ *Some Points in the Surgery of the Brain*, London: Macmillan & Co., 1907.

² *D. m. W.*, 1904.

performed in this region. The conditions in the posterior cranial fossa, where most meningeal infections begin, are much more complicated. The area can be rendered accessible, however, by the removal of the posterior surface of the petrous pyramid to the internal auditory meatus, sacrificing a portion of the labyrinth. Incision of the dura in this region also gives access to the cisterna magna, that distended portion of the subarachnoid cavity which would of course replace lumbar puncture. After the dura is broadly incised gauze tampons should be introduced in the subdural space, producing a form of "auto-irrigation." These operative procedures are not supposed to subject the patient to great danger and can therefore be undertaken before the advanced stages of the meningitis have set in.

The report of these successful cases is extremely encouraging, as it shows that something at least can be done with some hope of averting the usual outcome of purulent meningitis in the cases which do not rapidly become general. On the other hand, as Hinsberg, in the conclusion of his paper on this subject, says, the difficulties attending the localization, diagnosis, and after-treatment are so formidable that it requires an unusually fortunate association of favorable conditions to effect a cure.

It seems to me that just as in general surgery the advance in the treatment of peritonitis, as I have it on competent authority, is due to the more thorough elimination of the primary focus; so in the treatment of otitic meningitis, our aim should be directed to better eradicate the primary suppuration in the temporal bone, and that in many cases means the early recognition and proper surgical treatment of the labyrinthine suppuration.

REPORT OF THREE CASES OF INFECTIVE SINUS THROMBOSIS.¹

BY DR. J. D. RICHARDS, NEW YORK.

CASE 1.—Mrs. B., operated on at Far Rockaway, February 10, 1907. On January 26th, the patient was stricken with grippe and three days later an acute otitis of the left ear developed. An examination at the time revealed a reddened membrana tympani which was not bulging and an absence of mastoid tenderness; slight temperature attributable to the general infection. The drum was not incised. On the day following there was slight tenderness over the mastoid and considerable pain in this region. This disappeared quickly upon hot irrigation. There was no aural discharge. The patient continued depressed, and on February 8th she was seized with a chill. Temperature rose to 105° F., remitting to 102° F. A profuse sweat followed.

Five hours later there was a second chill. Temperature rose again to 105° F., remitting several degrees.

There had been a history of old malarial infection, but the blood examination proved negative and quinine was ineffective in controlling the recurring paroxysms, which repeated daily until February 10th, when I first saw the patient. Slight tenderness had now developed over the upper portion of the neck due to swollen glands, and this had aroused a suspicion that the ear might be the disturbing factor.

At this time the patient was profoundly septic—relaxed, clammy, and slightly jaundiced. The breath was heavy and the tongue thickly coated. Temperature 103° F.; pulse 120.

¹Read at the meeting of the Section on Otology, N. Y. Acad. Med., April 12, 1907.

The membrana tympani was reddened but not bulging, and its appearance in itself would not have indicated the necessity for an incision. There was some moisture in the canal due to irrigation. The mastoid was nowhere tender.

Posterior to the mastoid tip, there was a slight but scarcely noticeable cedema. Eye-grounds were negative.

An operation revealed a perfectly sclerotic bone with the exception of a little diploic structure at the tip. The antrum contained a few granulations but no pus. The sinus was far forward, and after its exposure from a point above the knee to its horizontal limb, was found normal in appearance. Palpation revealed nothing. The vessel was explored purely upon the symptoms.

A free flow from the torcular end occurred and the interior of this portion of the vein was normal in appearance. From the bulb end of the sinus, there was no flow whatever. After slitting open the external sinus wall well down toward the bulb, no clot could be seen in the deep horizontal limb. The wound was packed and a jugular resection was done. The vein appeared normal and was moderately well filled. Swollen glands were removed from the upper portion of the neck.

Upon returning now to the mastoid wound to remove the clot from the deep limb of the sinus, upon the removal of the gauze packing over the lower end of the opened vessel, a recent thrombus was extruded and this was followed by a profuse gush of blood from the bulb. No manipulation with the curette was necessary to dislodge the clot. This was accomplished by the reversal of the blood current. (The avenue of the jugular being closed, the flow from the tributaries to the bulb was diverted upward, carrying the clot before it.)

The day following operation the rigor was repeated, the temperature rising to 104° F. A sweat followed. From that time on there was a rapid decline in the temperature, and the further history of the case was uneventful.

Four days following operation, the wound was dressed. Pus issued from the deep horizontal limb of the sinus, and the external wall of the vertical sinus limb (portion of which was not removed at the time of operation owing to the

inconvenience caused by bleeding) had now assumed as far up as the knee a dirty-yellow purulent color, showing that the sinus wall though normal in appearance at the time of the operation had already become involved in a purulent phlebitis, which was unrecognizable.

The points of interest in a case of this character are numerous, particularly with reference to surgical technique.

First: The insidiousness of sinus thrombosis is illustrated. The absence of mastoid tenderness was in part due to the sclerotic character of the bone. At the same time the mastoid inflammation had practically subsided and the pathological condition of the bone would not of itself have warranted operation. Intracranial infection may appear, as I have on several occasions seen, weeks after the mastoid inflammation has subsided and the aural discharge ceased.

Second: When in a case of this character we are confronted with symptoms of septic absorption (other causes having been excluded) we must open the sinus as an exploratory measure purely upon symptoms, regardless of the physical signs—*i. e.*, of the color of the sinus, the presence of granulations upon the wall, the "feel" of the vessel, etc.—for the thrombus may be deeply situated in the horizontal limb, where a physical examination of the vessel is impossible. Delay in this instance would have been fatal, nor is this attitude in accordance with true conservatism.

Third: Had the attempt been made, after opening the vertical sinus limb, to dislodge the clot from the deep portion of the vessel with a curette before jugular resection, or had temporary pressure been instituted over the course of the jugular in the neck with the same purpose in view, both would have succeeded; a jugular resection would under these circumstances have appeared superfluous.

That a jugular resection is necessary where the deep horizontal limb or the bulb is involved (even though

the clot be extruded) was shown by the fact that four days after operation fluid was issuing from this part of the vein. In other words, the infected clot is not the only pathological factor with which we have to deal—a purulent phlebitis exists which continues to infect the contents of the vein at this point, and it is necessary to block from the general circulation this infected focus. Had the jugular vein not been removed the patient would have continued in sepsis.

Fourth: One of the dangers attending primary jugular resection is shown. Had the jugular been removed before opening the sinus, the currents tributary to the bulb would have been diverted upward, and the clot (which was recent and not firmly adherent) would have been dislodged and carried with the stream. We then would have had set free in the circulation an infected embolus of such great size that a disastrous result could scarcely have been averted. Upon opening the sinus, we then would have found no clot and would have thought the diagnosis mistaken.

The conditions which render primary jugular resection a dangerous procedure are: 1st, patulous tributaries to the bulb; and 2d, a loosely adherent clot (either recent or disintegrated), the site of which is above their point of entrance—that is, on their torcular side. These conditions existing, a primary jugular resection is a most dangerous procedure.

I have on several occasions seen clots gradually worked up from the deep horizontal limb of the sinus by the reversed pressure caused by a jugular resection diverting the currents of the tributaries to the bulb upward. It is a good idea to have an avenue of exit for such clots.

That the jugular bulb was not the site of the thrombus in this instance, but that the clot was confined to a point above the bulb, was shown by the fact that the upper portion of the jugular in the neck above the point of entrance of the facial was filled with blood (when the bulb

itself is blocked, the jugular vein above the point of entrance of the facial is, as a rule, collapsed), and again, by the fact that a return flow from the bulb was secured, showing that the tributaries thereto were not thrombosed. (When the bulb itself is the seat of thrombus we can, as a rule, get no return flow from the bulb, because this return flow is dependent upon the patency of the tributaries to the bulb, and the tributaries under the conditions mentioned are also blocked.) Cases of this character are frequently, but erroneously, reported as cases of primary jugular bulb thrombosis, in which, to explain the presence of the thrombus at this supposed point, it has been assumed that the route of infection is through the floor of the tympanum; but a consideration of the facts in these cases where a return flow from the bulb is secured after the removal of the thrombus rather convinces us that the jugular bulb itself, in the great majority of such cases, is not thrombosed, and that the location of the clot is in the deep horizontal limb of the sinus well above the bulb.

The reason for this portion of the sinus being a not infrequent site of thrombosis is apparent when with a magnifying glass we note (in a recent subject) the manner of distribution of the blood-vessels radiating from the antrum.

CASE 2.—A middle-aged woman, operated upon at the Manhattan Eye, Ear, and Throat Hospital, March 4, 1907, with the following history:

Five weeks previously she had an attack of acute mastoiditis of the right side accompanied from the first by symptoms of labyrinthine disturbance. A profuse aural discharge continued for about ten days, when it rather suddenly ceased. The mastoid tenderness had now disappeared, and but for the distressing vertigo and tinnitus she considered herself well. A few days prior to March 3d (the date of my first examination), the symptoms referable to the labyrinth, which had persisted up to this time, became greatly aggravated.

There were repeated vomiting, disturbed equilibrium, inability to stand, and intense high-pitched tinnitus; at the time of examination there was rotatory nystagmus, increased on looking to the healthy side. There was no hearing, and the fork tests were corroborative of labyrinthine disease. The labyrinth condition will be reported in a subsequent paper.

The ear examination revealed a dry canal with no inflammatory condition of the drum whatever, no mastoid tenderness, temperature $99\frac{1}{2}^{\circ}$ F., pulse 100. The fundus of each eye was negative. There was marked prostration, and it was evident from the facies that the patient was ill and septic. Moderate headache was referred to the involved side.

The diagnosis of labyrinthine suppuration was made and verified by operation,—the oval window being the seat of fistula, the stapes having disappeared.

The findings in the mastoid were interesting in view of the fact that to all external appearances the inflammatory condition within the bone had long since subsided. There was no aural discharge, and had been none for weeks. There was no mastoid tenderness, and the drum was normal. The mastoid was opened—not with the expectation of finding it involved, but purely as a necessary step in approaching the labyrinth. There were found, however, scattered throughout the bone, numerous necrotic areas; a portion of the deep posterior canal wall separated as a sequestrum; parts of the tip and the pneumatic structure in the solid angle of the canals were necrotic; there were black congested areas which bled freely; there was no free pus present in the mastoid.

Following operation the temperature continued low, but without apparent cause the pulse became gradually accelerated, and during the next few days increased to 148 to the minute. Sugar had appeared in the urine subsequent to operation, but this did not satisfactorily account for the rapidity of the pulse. No conclusion could be drawn from the blood examination.

The patient's general condition improved satisfactorily, the mastoid wound and the interior of the labyrinth were covered with healthy granulations, and on March 22d the

patient was given permission to return to her home. The rapid pulse was still a puzzle.

On the afternoon of the same day the patient was seized with a chill, the temperature rose to 103° F., and a sweat followed. The wound was dressed and found healthy. A general examination failed to account for the symptoms. I then opened, at the time of dressing, the vertical sinus limb for exploratory purposes, and found it occupied by a disintegrated purulent clot which extended into the bulb. On pressing over the course of the jugular, the patient complained of no pain whatever, and there was no rigidity or cord-like swelling to be detected in the neck, although the condition later found upon operation would have led us to have expected both.

Under chloroform anæsthesia the thrombus was found to extend backward to the middle of the lateral sinus. Upon exposing the jugular, this vessel and the tissues immediately over its course were found glued in one common mass. The vein was a solid cord, yellow in color, and it stood out firmly as an artery; its sheath was greatly thickened. The tributaries to the jugular were so generally thrombosed that the operation was quite bloodless, no clamping of vessels being necessary. The thrombus extended throughout the jugular down into the thorax. At a point an inch above the clavicle the wall of the vein had softened and broken down, and the clot at this point was a collection of fluid pus. The vein was cut off behind the clavicle, no ligation being necessary. The stump of its cardiac end was seized with forceps and a large-sized ring curette introduced downward for the greater part of its length into the deep thoracic portion of the vessel, and an unsuccessful attempt made to establish a return flow from below. Much broken-down septic material was removed. During this manipulation there was repeated aspiration of air into the vessel, with no apparent ill result.

Several days later the wound was dressed and found purulent throughout; large quantities of pus drained down from the bulb into the neck wound; pus was issuing from the intra-thoracic portion of the vein. The temperature continued high at about 104° F., with but slight variation, and in a few

days the patient succumbed to general sepsis. There were no metastases.

The thrombosis in this instance was of long standing,—as was shown by its extensive character, the condition of the tissues in the neck, the thickness of the walls of the vein and its sheath, the softened and broken-down vein wall in the lower portion of the neck, and by the fact that the thrombus removed from the lateral sinus contained a small concretion which was hard and gritty to the touch (the report of the chemical analysis of this concretion has not yet been received), yet with this increasing septic invasion the temperature continued low, rarely rising above 100° F. In this instance evidently the pulse was the more important guide to sepsis—we should respect it more as an index.

CASE 3.—A child, eleven years of age, operated upon in the New York Eye and Ear Infirmary, March 11, 1907, with a history of long-standing chronic suppuration. The history of the present illness is somewhat indefinite. Two weeks prior to operation, pain in the left ear was complained of and slight discharge was noticed. On March 9th, the patient became delirious and the temperature, which from this time on was taken at irregular intervals, varied between 105° and 103° F. Mastoid tenderness was now for the first time noticed.

I first saw the child the day of operation, and examination revealed a bulging drum, sagging postero-superior canal wall, and an appearance of the fundus indicating an acute involvement of some duration, superimposed upon a chronic process. The antrum was very tender, the tip moderately so, the post-tip region negative. The neck was tender in the upper portion and decidedly stiff, but there was no retraction of the head. The patient was drowsy; the pupils contracted, their reaction normal; the fundus of each eye was negative. The reflexes were good.

The point of interest in the case was a horizontal nystagmus markedly increased when the eyes were directed to the

diseased side. When the eyes were directed to infinity or to the upper vertical meridian, the nystagmus was slight; when to the lower vertical meridian or to the normal side, it was absent. There was no history of vomiting. There was no inco-ordination, and the equilibrium was good.

By bone conduction all forks were lateralized to the involved ear; by air conduction the forks of the Hartmann set were heard throughout the scale, with a relative amount of shortening. Bone conduction was not shortened in duration. (A test of this character by no means excludes a serious involvement of the labyrinth in a suppurative process.)

Operation revealed a bone rather sclerotic for a child of this age; the mastoid involved throughout, and an absence of granulations; the antrum filled with thin, watery, stinking pus, mixed with white flakes; the aditus blocked by a plug of inspissated pus, which imbedded the horizontal limb of the incus; a stinking perisinus epidural abscess situated over the middle of the vertical sinus limb; the outer wall of the sinus purulent in color and free of granulations; a clot (mixed pneumococcus and streptococcus infection) extending from the knee of the sinus into the bulb, dark red in color and with numerous white purulent foci scattered through it; a mass of enlarged glands in the upper portion of the neck, and a jugular which was poorly filled, with the upper portion collapsed down to the point of entrance of the facial.

The tympanum was not disturbed at this operation, on account of the patient's general condition. Immediately following operation the nystagmus practically ceased, though for two days subsequent a faint oscillation could be seen when the eyes were directed to the operated side. The temperature quickly fell to 100° F. The pulse continued rapid, 140 to the minute.

Shortly afterward the radical operation was completed, and there was nothing found in the tympanum to make clear the cause of the nystagmus.

In this instance the nystagmus differed from that which is usually associated with labyrinthine suppuration, in that in the latter cases the oscillation is, as a rule, most marked when the eyes are directed to the extreme lateral position

of the normal side. As to why the first operation—which was confined to the mastoid, the sinus, and the jugular—should have caused a disappearance of the nystagmus, is not apparent. The further history of the case was uneventful.

A CASE OF SEROUS MENINGO-ENCEPHALITIS, WITH AUTOPSY REPORT.

BY DR. ALBERT BLAU, GOERLITZ.

Translated from *Zeitschr. f. Ohrenhkl.*, Vol. LII., p. 129, 1906.

THE lack of definite autopsy findings, as Koerner has stated in the last edition of his book on *Otitic Diseases of the Brain*, etc., has not permitted the recognition of serous meningitis as a distinct disease consecutive to purulent otitis.

It seems of interest to report a case of this kind where an autopsy was performed.

E. K., two and three-fourths years old, two weeks before Christmas was taken ill with measles. On January 1st pain began in the right ear, followed by discharge, loss of appetite, general depreciation of health, gradual loss of eyesight and of hearing, left-sided ptosis, occasional convulsions in the left arm and the left leg, with moderate rise of temperature.

The eyes were examined on January 19th.

In the right eye the pupil is round, sluggish. The disk is pale and the arteries thin.

Left eye: the upper lid hangs down, pupil moderately dilated, irresponsive; the optic nerve the same as in the other eye.

On January 26th, I had the opportunity of examining this child, and found an emaciated, somnolent, pale child with some difficulty in breathing. T. 38° C. Pulse 60-80. The lungs and heart are normal. Reflexes absent. No rigidity of neck. Abdomen retracted. Incontinence of

fæces and urine. Urine normal. Right auditory canal contains fetid discharge. The drum is almost completely absent. Mucous membrane in the tympanum granular. No mastoid symptoms.

No lumbar puncture was performed.

On January 20, 1905, the antrum was opened. There was no pus. The mucous membrane was swollen and granular. A part of the carious posterior wall was removed. The middle fossa was exposed to an extent of 1 cm. The dura was tense, of a grayish-white color, slightly injected. After incising the dura, the brain was punctured in three directions without finding any pus, though a large quantity of clear fluid was evacuated on each insertion of the knife.

The sigmoid sinus and the posterior fossa were exposed. Incision gave the same result as in the middle fossa.

Eight hours later the left eyelid could be somewhat raised. Death followed eighteen hours afterward.

Autopsy.—The dura moderately injected and very tense. The longitudinal sinus contains coagulated blood. The pia is transparent, slightly anæmic. The pial vessels are very thin. The convolutions are unusually flattened. They are carefully examined but no evidence is found of cloudiness or adhesions, no tubercles and no pus. The brain substance is of moderately firm consistency. A few bleeding points in the medullary substance. Both lateral ventricles are enormously dilated. They would accommodate three-fourths of a child's fist. The adult thumb could easily be introduced into the dilated horns. The thalami and the corpora striata are flattened. The third ventricle is also dilated. There is a great deal of watery fluid.

There are a number of points in this case confirming the diagnosis of purulent meningitis, which was originally made by the family practitioner, namely, the paralysis, the incontinence, the retraction of the abdomen, but there was no rigidity of the neck, only moderate variation in temperature, no contracture, free mobility of the head, and the condition of the pulse. The condition found in the ear shows that the otitis was not acute. The

absence of the drum, the granular tympanic mucous membrane, the kind of discharge, the destruction of the posterior canal wall, all point to a chronic otitis, though we must remember that frequently after acute infectious disease otitis occurs with a rapid disintegration of bone. The possibility of the presence of an abscess justified an operation. The conditions found at operation suggested a serous meningitis—the enormous quantity of clear fluid evacuated on puncturing the brain. This supposition was confirmed at autopsy.

All the conditions which Boenninghaus suggests for the diagnosis of acute internal serous meningitis were present:

1. There was no fresh purulent meningitis or residua, no tuberculous meningitis, no tumors or abscesses.
2. The ependyma was not thickened and not clouded.
3. The brain was subjected to a fatal compression.

Among the cases which Boenninghaus describes there are a number which apparently were caused by measles.

In our case the measles infection seems to have run its course. The severe trouble seemed to follow a relapse of an otitis caused by measles.

The course of the disease makes the presence of an inflammatory hydrops of the ventricle probable. All the symptoms caused by this increased liquor came on in a relatively short time after good health. The connection of the cerebral disease with the ear condition is evident. In most cases of serous meningitis there is a pronounced optic neuritis.

The mydriasis of the left pupil occurring forty-two hours before death is a comparatively frequent symptom due to an encephalitis or to increased intraventricular pressure. I think our case is to be regarded as one of acute internal serous meningitis with encephalitis. It seems probable that the encephalitis did not occur until towards the close of the affection. The operation and the autopsy did not reveal caries of the bone leading to

the dura. There is, therefore, no direct communication between the primary disease of the temporal bone and the interior of the skull. A direct bacteriological infection can hardly have caused disease of the meninges, and the case can probably be regarded as confirming Merkens's suggested explanation of serous meningitis, that it is a disease caused by toxic agents. At the same time, measles can hardly be regarded as the cause.

This condition was found, as is usual, in youthful individuals, our patient being two and three-fourths years old.

ANOTHER CASE OF OTITIC PURULENT SINUS THROMBOSIS WITHOUT FEVER.

BY DR. HERMAN SCHROEDER, ERLANGEN,

Translation from *Zeitschr. f. Ohrenheilk.*, Vol. LII., p. 357, 1906.

ALEXANDER'S case (which appeared in *Arch. f. Ohrenheilk.*, 1905, p. 89) has led me to publish the following, which is similar on account of the afebrile course of the sinus phlebitis.

The case-history is as follows:

P. M., forty-nine years of age, was admitted on July 4, 1905. Nine years ago he suffered a severe injury to the head and to his ribs by falling from the roof of a building. In February, 1905, pain was experienced in the left ear and behind the ear. There had been no previous otorrhoea. Two weeks later the ear discharged. The pain grew less, but persisted behind the ear. He was treated by a specialist and the condition improved somewhat, until in July it again grew worse. The patient complained of tinnitus, deafness, occasional vertigo, and vomiting.

On examination; large well-built man. Pupils react promptly. Ocular movements normal. No nystagmus. Eye-grounds normal.

Right ear: *Mt* opaque.

Left ear: there is a large quantity of purulent, fetid pus in the canal. The upper wall is depressed. The drum is red, bulging in its posterior half. Some infiltration about the apex of the mastoid process, tenderness over the antrum and at the apex. The glands below the mastoid process are enlarged and tender.

Whisper is perceived: right in $1 \frac{1}{2}$ m; left $\frac{1}{2}$ m.

T. 37.5° C. Pulse 80.

The pus contained staphylococci.

Operation July 7th: The antrum contained pus. The sinus was exposed and found covered with discolored granulations. Pus exudes from the sinus through an opening large enough to admit a thumb. The sinus is further exposed and pus is found between the sinus wall and the sulcus. The opening into the sinus is enlarged and the sinus cavity is shut off above and below by a firm thrombus. The wound and the sinus are packed with vioform gauze.

July 8th, T. 37° - 37.9° C.

July 9th, T. 37° - 37.2° C.

July 10th to the day of his discharge, August 8th, T. varied between 36° and 37° C.

The recovery was otherwise uneventful.

The similarity between our case and that of Alexander consists in the afebrile course during the entire period of observation of this case. A decided difference in the two cases is to be found in the bacteriological conditions. In Alexander's case the bacteriological examination showed gram positive diplococci in the pus of the abscess and in the thrombus, frequently with typical capsules; culturally the colonies were those of the diplococcus characterized by an unusual mucoid condition in agar, corresponding in other biological and cultural characteristics with the diplococcus of pneumonia. It is impossible to say whether this diplococcus is different from the true diplococcus of pneumonia and is responsible for the unusually mild course of the thrombosis.

In our case repeated examination revealed the presence of the staphylococcus pyogenes aureus.

The afebrile course in the two cases can be explained by the previous history and by the good general condition of the patients. In both cases the ear trouble had existed for months and the patients were very healthy individuals. The local trouble had existed for quite a

long time and the protective powers of the patients prevented the infection becoming general. In Alexander's case a layer of granulations 3mm thick was situated on the dura and there was a firm thrombus in the sinus. In our case the dura of the cerebellum was not involved, while the blood current in each direction was shut off by a firm thrombus. Owing to the favorable conditions found at the time of operation no treatment was decided upon.

REPORT OF THE TRANSACTIONS OF THE SECTION ON OTOTOLOGY OF THE NEW YORK ACADEMY OF MEDICINE.

REGULAR MEETING, APRIL 12, 1907. DR. WENDELL C. PHILLIPS, CHAIRMAN.

Report of a case of diphtheria, complicated by acute mastoiditis and infective sinus thrombosis. P. D. KERRISON, M.D. (Published on pp. 412-415 of this issue.)

Report of a case of occlusion of the external meatus in an infant, the result of forceps delivery. W. H. HASKIN, M.D.

Harold Lyon, seventeen months of age, first came to the Manhattan Eye and Ear Hospital, February 19, 1906. At that time he was three months old and apparently a strong healthy child. He had an ulcer just behind and below the tragus, which the mother said was caused by forceps used in her delivery. As this was the only thing which had attracted the mother's notice, I did not look farther, but succeeded in healing the ulcer very promptly.

Six weeks later he was brought back with an apparent earache. On examination I found an almost complete occlusion of the external meatus. With difficulty I succeeded in introducing the smallest Eustachian bougie, and found the occlusion to be only at the meatus. By increasing the size of the bougie gradually, I succeeded in getting quite an opening—only to have him disappear for a year.

April 1, 1907, he returned with a history of recurrent discharge from the ear, of a watery nature. The opening had almost closed again, but probing with lachrymal probes

gradually increased the size. I have the mother now use daily the No. 12 Bowman. I purpose to dilate still farther and then to introduce a short hard-rubber tube, and in this way try to overcome permanently the obstruction.

The question of interest is one of congenital occlusion or the result of traumatism in delivery. The fact that the child had an extensive laceration behind and below the tragus would incline to the latter view. The child had never had any running from the ear. It was only six weeks after first coming to the hospital that I introduced a bougie and found the fluid in the canal. The child at that time had an adenitis and was suffering from absorption of pus. The mother did not bring him back until two weeks ago, but has been using the probe, and it is now comparatively open. The fact that the band of obstruction appears to spring from the anterior canal wall made me suspect the possibility of a congenital occlusion, even without other deformity of the ear.

Discussion: Dr. DUEL said that the lesion was probably traumatic.

Dr. PHILLIPS said that he had never seen a case of occlusion without deformity of some kind in the auricle. One of his own connections has an infantile ear, perfect in shape, but it has never grown, has no external canal, but the Eustachian tube is normal. He thought that this case must be traumatic in origin.

Dr. HASKIN said that the only thing that made him feel that the case might not be traumatic was the fact that the opening was along the posterior wall. The band closes the external meatus. There is practically along the anterior wall a membranous band over which you can hook a probe, and it looks like a false membrane.

Presentation of a case of displacement of the auricle by a tumor. WENDELL C. PHILLIPS, M.D.

This little patient who has a large tumor, involving a portion of the head, face, and neck, is eleven years of age. The mother did not observe the growth until the child was two years old, or about the time when she began to take solid food. At that time the mother noticed that whenever the child ate, especially anything sweet, there was a flush of the whole side of the face, and that has kept up all these years,

excepting that at the present time only the upper portion of the neck and face becomes red when she eats sweets. Dr. Phillips himself had never witnessed this phenomenon, but the mother states that it always occurs. He was not sure that this had any influence in the case, although it might have. In response to an inquiry as to whether the tumor itself became red, Dr. Phillips said that the mother of the child informed him that only the upper part of the face was so affected. The little girl is a child of good ordinary intelligence and in fair general health. Since two years of age the swelling has increased gradually in size. The growth evidently begins at about the centre of the ramus of the jaw and extends along the face, involving the ear, so that a large portion of the neck and even of the mastoid region is affected. It has completely separated the membranous from the bony attachment of the external ear. You can see that from the way it droops, and still the external auditory canal remains intact. Hearing is not affected. Examination of the mass shows it to be a very soft, almost pultaceous tumor. When first seen it was thought that it might be a benign fatty growth. The only points that lead to the belief that it may be something else are the flush, and that on deep palpation there is sensation as of some enlarged blood-vessels. Whether it was a kind of nœvus or some sort of fatty tumor, Dr. Phillips could not say, and he expressed himself as anxious to have some light on the subject. If the growth were removed, it would not be difficult to anchor the ear, and it might be advisable to make an incision and remove the growth.

Discussion.—Dr. JOHNSON inquired whether there was any bruit on auscultation, to which Dr. PHILLIPS replied that he had not observed any.

Dr. WILSON inquired whether there was any pressure on the carotid.

Dr. JOHNSON questioned whether any surgical procedure could be effectively done. It would be a very extensive operation, and he thought that some form of electrolysis might be used to advantage, and later change the position of the ear by operation. Before any conclusion was reached, however, it would be well to make a very critical examination of the case, and this examination should include the use of

the stethoscope, pressure on the carotid, to ascertain the state of the venous supply: and if it was finally concluded that it was an angiomatic tumor, he thought that the best treatment primarily would be electrolysis. It was a rather large angioma to be treated in that way, but he had seen one situated on the nose and cheek disappear under electrolysis. Most writers, however, do not favor electrolytic treatment on tumors larger than a hazel-nut, but as this case extends over so large a surface and would require such an extensive surgical procedure, it might be well to try it before proceeding to the more extreme measures.

Dr. COBURN suggested that there were two other ways of operating on such a case—one being Dr. Wyeth's method of injection of boiling water, and the other the injection of absolute alcohol. These methods have been used very successfully in certain vascular tumors. This is a very large tumor, but these methods of treatment ought to be borne in mind as by their use the disfigurement of scars is avoided.

Dr. SMYTH said that it seemed to him that if this was an angiomatic tumor pressure would produce more effect upon it. Pressing upon the tumor does not interfere with it in any way and does not appear to reduce the size.

Dr. DENCH said that as the tumor had been present for nine years he hardly thought it was an angioma. He would expect an angioma of this extent to increase in size more rapidly. He would also expect to find more enlargement of the superficial vessels. The change in color which was observed during mastication was one which might be caused by any growth in this region, angiomatic or otherwise. The blushing of the integument over the growth during mastication could easily be caused by pressure upon the vasomotor nerves. There was a certain portion of the growth behind the ear which upon palpation seemed to suggest angioma. If, however, this peculiar feeling were due to blood-vessels, there would certainly be more superficial injection. Dr. Dench was inclined to consider the mass a lipoma. Considering the fact that the mass lying in the concha would have to be removed, it seemed to him that the best procedure would be to remove this first, by dissection, thus correcting the deformity caused by this mass, while at the same time

the operator would be able to determine exactly the nature of the tumor. If the growth were lipomatous, it could probably be extirpated, and if angiomatous, the best procedure would be excision of the external carotid and its branches.

Dr. PHILLIPS said that his mind had not inclined to angioma at first, for it seemed to him that an angiomatous growth would show more on the surface; but when the mother told him of this flush, a later examination led him to think of that as a possibility. He appreciated the suggestions that had been made, and intended to take up the case carefully and decide upon some method of procedure soon.

The herpetic inflammations of the geniculate ganglion and their complications in the aural region. J. RAMSAY HUNT, M.D. (Published on pp. 371-381 of this issue.)

Discussion.—Dr. DENCH said that he had seen one case of this kind, where the disease had complicated an acute otitis, which finally went on to mastoid infection, requiring mastoid operation. The cause of the acute otitis was the use of the nasal douche. The mastoid symptoms developed seventy-two hours after the beginning of the acute otitis. The mastoid operation was performed in this instance. The pain through this entire attack had been unusually severe. Two days after the mastoid operation, the pain still remaining severe, a vesicular eruption appeared upon the auricle. With the subsidence of this eruption, the pain disappeared, and the case made a rapid recovery. In this instance, the pain preceding the eruption was typical. Dr. Dench had seen one or two other cases. In one case there was a history of pain in the ear, and although the case was not seen during the vesicular stage, the scars marking the site of the vesicles could be easily seen.

Dr. JOHNSON inquired whether these cases had been reported.

Dr. DENCH replied that the case of mastoiditis had not been reported, but that one of the other cases had been mentioned in his book.

Dr. ARNOLD KNAPP said that he had been very much interested in the paper, especially in the group of cases which Dr. Hunt had described in which the cutaneous eruption has a different area from the ear involved, and he would like to

know if, in those cases where the herpes was in the occipital, neck, or ophthalmic region, the aural disturbances were preceded by a herpes of the auricle, for it seemed to him, if he understood Dr. Hunt correctly, that an involvement of the geniculate ganglion first shows itself by herpes of the auricle. If the herpes is present in a different distribution, why should the facial be involved without herpes of the auricle? He also inquired whether in Dr. Hunt's pathological investigations the auditory nerve had been examined, and whether this nerve was found involved either by pressure or by direct inflammatory extension, and whether the vestibular branch or the cochlear branch was affected.

Dr BRYANT said that he had been very much interested in this subject, and in his experience, covering twenty years, during which he had seen more than 20,000 patients, he had seen four or five of these cases, all of them at the Eye and Ear Infirmary in Boston. In most of the infirmaries with which he had been connected, it was the custom to put down the chief or common diagnosis, the minor or rarer complications like herpes not being put down, and in that way probably a great many cases have been left off the records. Dr. Bryant saw a case this summer, with Dr. Hunt. The case was not seen till after the herpes had disappeared, but the nerve lesion persisted.

Dr. RAMSAY HUNT, in closing the discussion, referred first to Dr. Dench's case and said that herpes of the auricle secondary to, or at least associated with, otitis media, is a rare complication. These cases he had not included in his series. The series of sixty-one cases presented in his paper were all uncomplicated cases of herpes, *i. e.*, true herpes zoster, and there was no question of any secondary manifestation. While the true herpes zoster is dependent upon ganglionic inflammation, there is undoubtedly a neuritic form of herpes, such as follows injuries and inflammations of the nerve trunks; so that in cases of suppurative otitis media with a complicating zoster the sensory nerves innervating the auricle and the canal may be invaded by the inflammatory process, and thus secondarily give rise to zoster of neural and not ganglionic origin.

In regard to the pathology, one of his cases, which he

had not alluded to in his remarks, died 87 days after the appearance of the eruption. The herpes was distributed over the head, neck, and ear (*herpes occipito-collaris et auricularis*), and was distinctly a double manifestation of zona. A careful study was made of the spinal ganglia, the spinal cord, the medulla, the facial nerve, and the nerve of Wrisberg. The secondary typical changes were found in the tip of the third spinal ganglion and in the spinal cord, and in the posterior root of the third cervical nerve, as have been described in other cases of this affection. An attempt to remove the geniculate ganglion was made, but was unsuccessful. The facial nerve and the nerve of Wrisberg were studied, however, by the osmic-acid method, which is a very sure one, and the same secondary changes were found in the nerve of Wrisberg and its intramedullary root in the medulla as were found in the third cranial nerve root and the spinal cord. These secondary changes in the nerve of Wrisberg or the afferent root of the seventh nerve indicate that the geniculate ganglion was involved. In this case the auditory nerve was not affected clinically, so that it was not subjected to any examination.

Replying to Dr. KNAPP: In his series of sixty-one cases with herpes of the face, neck, and ear, and complicating facial palsy, auditory symptoms were present in twenty-one. Of these cases with acoustic symptoms, nine had a herpes occipito-collaris, four herpes facialis, and seven herpes auricularis. In this latter group the herpetic vesicles were confined to the region of the concha and auditory canal. In herpes zoster in general, the skin manifestation is usually a single one, corresponding to the cutaneous zone of a single spinal ganglion. This is, however, not always the case, and multiple involvement of the ganglia is shown clinically in the double, triple, and bilateral forms. There is also no question that inflammatory changes may be present in the ganglion adjacent to the chief focus, which gives rise to the cutaneous manifestation. As the Gasserian, geniculate, and second and third cervical ganglia represent a more or less continuous series of ganglia in the cephalic extremity, it would seem reasonable to presume that a marked herpetic focus in one would also be accompanied by an inflammatory

reaction in the other ganglia of this group, of a like nature but of a lesser degree, thus explaining the presence of facial palsy and acoustic symptoms due to a geniculate ganglion inflammation, when the real zoster recurs in the face or neck, *i. e.*, the Gasserian or cervical representations, the geniculate zoster zone itself being quite free. It may also be remarked that the geniculate zoster zone is small and a very slight eruption might be overlooked in comparison with the chief eruption in the other areas. For the complete elucidation of this point, the exact clinical studies of the future will be required.

ARCHIVES OF OTOLOGY.

A CASE OF ACUTE LABYRINTHITIS DUE TO MENINGITIS (?).

By MACLEOD YEARSLEY, F.R.C.S.,

SENIOR SURGEON TO THE ROYAL EAR HOSPITAL.

THAT part of our knowledge which deals with diseases of the internal ear is, perhaps, the most deficient and uncertain in otology, and it is incumbent upon every practitioner to publish any case of interest that comes under his notice, especially when it presents features which are of essential help in diagnosis.

The following case emphasizes several points and, therefore, I feel it is worth placing upon record.

T. L., aged twenty-four, a native of Lancashire, was sent to me by Dr. F. S. Lambert for severe deafness combined, the relatives thought, with slight mental deficiency. His left ear was still functional to a limited extent. He had been a delicate child and made no attempt to speak until between the age of three and four years; his family thought he had been born deaf, but careful questioning elicited the fact that in early infancy (about one and a half to two years) he had had a serious illness, during which he put his hands to his head frequently and was continually shaking it, so that the condition was evidently accompanied with severe head pain. Interrogation showed that the patient was of fair average intelligence, and the "slight mental deficiency" was really due to his marked deafness and was more apparent than real. There was no tinnitus or vertigo.

On examination both tympanic membranes were normal, and showed good mobility to the pneumatic speculum.

Beyond the fact that he was recovering from a slight cold, no abnormalities were to be seen in the upper air passages.

Tests.—Weber's test was lateralized to the left (the better ear). The acoumeter could not be heard by either ear. Voice: R. 0, L. 9 inches. Whisper not heard by either ear. Rinné (C 128) negative left. Bone conduction to C 128 : Right 0, Left - 32 secs. Upper-tone limit, to the Edelmänn-Galton-pfeife: Right 0, Left 5.6. By air conduction, with tuning-forks from 3 C 16 to C 2048, the right ear could hear nothing. The left ear did not hear 3 C 16, but heard all the other forks, C 128 being - 67 secs., and C 2048 being - 30 secs.

The case was evidently one of the effects of acute labyrinthitis, probably due to meningitis in early infancy, the history affording fairly clear evidence on that point. The tests having been taken with great care, they are worth placing upon record. It will be noted that Rinné was negative on the left side, but, remembering that the preponderance of air over bone conduction with the C 128 fork is 35 secs, it will be seen that, the loss of bone conduction being 32 secs. and of air conduction 67 secs., the reaction of the test only just missed being positive. It is possible that, had the man not have been recovering from a cold in the head, it might have been positive. The test was carefully and repeatedly taken, to ensure accuracy. It was taken with a Lucae's fork, and not with the misleading and unscientific Gardiner-Brown fork so often used by British otologists. Another point of interest is the retention of the lower-tone limit (due to the fact that the middle ear was intact). The case has been recommended to take lessons by the pure oral method, and, considering the man's intelligence and the fact that he retains a certain amount of hearing in one ear, the result should be good.

ON THE SURGICAL EXPOSURE OF THE JUGULAR BULB.

BY DR. VOSS,

ASSISTANT AT THE CHARITÉ EAR CLINIC, BERLIN.

Abridged Translation from the *Zeitschr. f. Ohrenhkl.*, Vol. XLVIII.,
No. 3, by Dr. ADOLPH O. PFINGST, Louisville.

(With five illustrations on Plates XI-XIV., *Zeitschrift f. Ohrenhkl.*,
XLVIII.)

A METHOD of exposing the bulb of the jugular which was first described by me in 1903¹ has been so successfully employed ever since that a more detailed description of the operative technique seems justified. Experimentally, I have observed that in many specimens of the temporal bone the jugular fossa is not found at the floor of the tympanic cavity as is generally supposed, but near the median wall of the cavity. The fact, pointed out by Zuckerkandle,² that the bulb is not infrequently situated far backward near the mastoid or even encroaching on the bone could be corroborated by my specimens. In such specimens the floor and median wall of the tympanum as high as the promontory were made up of bone which separated the jugular fossa and the carotid canal.

Zuckerkandle² and others³ have shown that the jugular vein frequently takes a straight course without

¹ Voss, *Berlin. klin. Wochenschrift*, 1904, No. 28.

² Zuckerkandle, *Arch. für Ohrenheilkunde*, vol. lvii.

³ Stenger, *Arch. f. Ohrenheilkunde*, liv., p. 216

Grunert, *Arch. f. Ohrenheilkunde*, lvii., p. 23.

forming a bulb or jugular fossa, and that the size of the fossa and bulb is in direct relation to the deviation of the vein from its straight course. It has also been demonstrated that the bulb in those cases characterized by a sharp turn or marked elbow is always higher than the lowest portion of the sigmoid sinus. Based upon this anatomical fact, I follow the routine of exposing the bulb of the sinus subsequent to laying bare the lowest portion of the sigmoid sinus.

In brief, the operation is as follows: After completing the simple or radical mastoid operation, the sinus is exposed and the overlying bone removed downward to get to the lowest part of the vein. In order to avoid injury of the facial nerve, the bone is removed in very small pieces with biting forceps and narrow gouge. As the bone is removed downwards, the vein becomes more and more horizontal, the lateral wall of the sinus becoming the inferior. This lower wall of the sinus is followed by removing bone with concave gouges. By following the course of the vein with a probe the distance to the anterior wall of the jugular fossa can be determined as well as the relation of the boundaries. The next step in the operation, the exposure of the bulb, is accomplished by very cautiously removing the bony wall above the lowest part of the exposed sinus, or in other words the anterior boundary of the jugular fossa. To avoid injury of the horizontal semicircular canal, the bone is not removed higher than 0.5cm. The posterior membranous wall of the bulb is readily exposed in most subjects by this procedure. This is especially true in cases of a well-defined bulb as is observed frequently on the right side. Work along the vein is facilitated by the use of a small flat spatula, by means of which the sinus and the underlying cerebellar substance are pushed aside while working on the bone. After the posterior wall has been removed up to the roof of the bulb, it sometimes becomes necessary to remove the edge of bone which

marks the separation of the sinus proper and the bulb. This shows the sharp knee formed where the lateral wall of the sinus goes into the posterior wall of the bulb. As a rule, it is easy then to cut away the overhanging edges of bone around the entire circumference of the bulb.

Whenever the contents of the bulb is fluid, the bulb has a bluish-gray appearance, and whenever it is filled with a thrombus it has the characteristic appearance just as we see it in the sinus. In one of my cases of thrombosed bulb the color of the vein was normal, but inability to compress the vessel demonstrated the presence of the thrombus. The nature of the bulbar contents can also be determined by aspirating the bulb. Incision of the bulb is practised whenever the contents are found diseased, the thrombotic masses being removed as far as possible with curettes and forceps aided by irrigation. By the removal of the lateral wall of the sinus and the posterior wall of the bulb, the vessel is converted into a gutter, as it were, easily accessible to treatment, just as it is in the method of Grunert.

Apparently the described method has a disadvantage compared to the procedure of Grunert, in so far as in the cases in which ligation of the jugular becomes necessary the jugular cannot be included in the incision and gutter formation as described. This can hardly be considered a real disadvantage as the short section of vein above and below the incised bulb is easily accessible to treatment without laying it open.

The advantages of my operation are that, first, the operation is made a part of the mastoid operation, or in other words is merely a more extensive removal of bone than is practised ordinarily in mastoid surgery, while the operation advised by Grunert necessitates a large incision of the soft parts along the base of the skull with subsequent disfigurement; secondly, injury to the facial while possible is very improbable with ordinary care, while injury of the nerve is rather expected in making the

Grunert operation; thirdly, the anatomical abnormalities at the base of the skull which frequently make the Grunert operation so difficult play no part in my operation.

By pointing out these advantages I do not wish to create the impression that my method of operation is simple or easy, but that it has advantages over the other methods employed to expose the jugular sinus. The question whether the operation will serve in every case, including those where the bulb is situated far forward, must be left open. In the twenty bone specimens used by me in my work and in the four cases in the living the method served the purpose admirably, the bulb being bared in every instance. A greater number of cases will have to show whether the operation will answer in every case.

It seems that Jansen¹ has exposed the bulb by approaching it through the mastoid bone before my first report in July, 1903, but in his report no details of the method of operation were described.

The points of interest in the four cases operated on by me are as follows:

Case 1.—Male, age forty-eight, acute middle-ear suppuration on right side following gripe. Six weeks after the beginning of otorrhoea some dizziness, several days later some tenderness over middle of mastoid at the posterior edge. No other symptoms of mastoid involvement; temperature 36.8° C., pulse 55. Two weeks later simple mastoid operation with exposure of sinus. The bone was found spongy and filled with granulation tissue. The exposed sinus normal in color and consistence. The contents of the sinus also normal. For some days following the operation, the temperature remained normal, but the pulse continued slow, varying from 57 to 68. On the twelfth day after the operation severe pain developed on right side of head and neck and marked dizziness and some cyanosis on the right side of the face. The mind became sluggish. Pulse rapid, 128. Temperature 38.2° to 39.5°. The fluid withdrawn by lumbar puncture was cloudy

¹ Gerber, *Handatlas der Operationen am Schaeffenbein*, 1904.

and discolored and contained erythrocytes but no bacteria. Under chloroform anæsthesia removal of bone covering lower end of sinus. A small discolored area was exposed, in the middle of which a fistulous opening was found to lead into the vein. At the lowest end of the sinus, the lateral wall was absent but no clot present; however, in following the sinus in an upward and backward direction a thrombus was found entirely obliterating the lumen of the vessel. The bone was removed 2-3cm beyond the knee, the sinus incised, and a long solid mass removed. As exploration towards the bulb revealed a thrombus mass the operation as described was performed, bone above the level of the lowest end of the sinus being removed, thereby exposing the posterior wall of the bulb. The vessel was incised and the thrombus removed as far as the beginning of the jugular vein. The patient made a good recovery.

Case 2.—Female, forty-six years old, was seen four weeks after the beginning of an acute purulent otitis media following acute coryza. She was having severe pain behind the right ear, associated with marked tinnitus. Three days before she was first seen, she had a marked chill, and for two days continuous headache, insomnia, loss of appetite, and rigidity of the neck. She had a peculiar sprawling gait with a tendency to move towards the right. Nystagmus; temperature 37.6° ; pulse 100. There was some swelling on the right side of the neck from the angle of the lower jaw to the tragus which was sensitive to pressure. The entire mastoid bone was also sensitive to pressure. The patient was subjected to an operation soon after her admittance to the hospital. The mastoid cells were full of pus. The sinus wall was discolored yellowish white and low down was necrosed, exposing a thrombosed mass in the interior. The jugular vein was ligated, the bone over the sinus removed upward until healthy sinus was bared, then downward and the bulb exposed as in the manner of case No. 1. The bulb which reached far into the mastoid bone was easily bared of bone posteriorly. It was incised, freely discharging pus and broken-down pieces of thrombotic mass. The mass was thoroughly removed with a curette and the bulb irrigated. This patient also made an uninterrupted recovery.

Case 3.—Male, twenty-two years old, acute otitis media purulenta on left side following nasal operation; mastoid tenderness on the seventh day. Sudden elevation of temperature with coincident cessation of pus discharge and pains in temple on the ninth day. On the eleventh day, chill, continued fever, and headache. There was marked tenderness over the tip of the mastoid, also over the antrum and along the course of the sinus. No swelling in neck and no muscular rigidity. The simple mastoid operation was done at once. Pus was liberated as soon as the outer plate of bone was opened. The mastoid cells near the antrum were found broken down and filled with granulation tissue. At the tip the cells contained pus. The sinus was exposed in the middle of its descending portion and appeared normal. Puncture revealed normal blood. Two days later patient was very restless and had a copious sweat. Pulse 100; temperature 38.4° to 39.0° . A swelling and red area, very sensitive to pressure, developed in the region of the left tibio-fibular articulation; a similar one on the median side of the left lower arm, after which further exploration of the wound was decided upon. The jugular vein was exposed and ligated above the entrance of the facial vein. The jugular bulb was then exposed posteriorly in the same way as in Cases 1 and 2. It appeared healthy and could easily be compressed. A tampon was inserted downward between the bulb and the surrounding bone and upward between the sinus and bone, and an exploratory incision made into the intermediate portion of the sinus. The interior of the vessel was found normal; no thrombosis was present. An iodoform compress was applied. After the operation the right side of the face became markedly cyanotic, lasting about four hours.

The patient continued to grow worse, metastases developing in the right shoulder-joint and lungs, and death followed by suffocation three days later. Post-mortem examination revealed a fresh non-septic clot in the left transverse and sigmoid sinus. The rest of the sinuses contained liquid normal blood. Phlegmonous swelling was noted around the epiglottis and false cords. Pneumonic infiltrations in different parts of lung, some of them in the right lung containing pus. Bacterial infarcts in both kidneys. The pus contained

diplococci and staphylococci. Exploration of the sinus and bulb seemed justifiable with the symptoms indicating sinus infection. Failing to find the vessel thrombosed and believing that we had to deal with a case of general septicæmia without thrombosis, further operation was regarded as useless.

Case 4.—Male, twenty-one years old, with vague history of ear trouble on right side seven years previously and some kind of operation three weeks before admittance, applied for treatment after about twelve days of suffering with the same ear. His temperature when admitted was 40.3° , pulse 124. Behind the right ear, a wound partially closed was visible. Extending downward to the angle of the jaw, a diffuse swelling, extremely sensitive to touch. The area of sensitiveness extended downward along the sterno-mastoid as far as the thyroid cartilage. At the posterior border of the mastoid near its middle, small circumscribed sensitive area was present; another corresponding to the position of the horizontal portion of the sinus. The ear canal was filled with foul pus; the upper posterior wall of the canal considerably swollen.

Operation.—In going through the old scar, a fistulous tract was exposed at the posterior border of the mastoid, at a level with the suprameatal spine, leading into the sinus, which was covered by grayish-white soft granulations. The sinus was exposed in both directions until healthy sinus was bared. Aspiration revealed normal conditions of sinus contents, but on account of the high temperature and local conditions the jugular vein was exposed and two ligatures loosely applied so that it could be tied in the event the symptoms continued. As the temperature continued high for three days after the operation, a second operation was decided on. The jugular ligatures were tied and the intervening portion of the vein incised with negative result. After application of upper and lower tampon, the discolored portion of sinus wall was removed, causing a gush of blood from the peripheral end of the vein. Tampon was applied. Eleven days later at change of dressing, pus discharged from between the middle and posterior cranial fossæ, and as the temperature still continued high a third operation seemed indicated. The bulb was partially exposed and showed a dirty-grayish surface. After

use of tampon it was incised and a few peripheral thrombotic masses found and removed and tampon applied. In removing the gauze tampon from the vein on the sixth day (this was not the first dressing), a quantity of pus, apparently under pressure, was discharged. The entire bulb was then exposed by the method employed in my other cases, and upon free incision a large quantity of creamy pus was liberated. The entire exposed portion of the membranous bulb was removed and the wound thoroughly irrigated. There was no improvement after the operation, the patient developing a purulent meningitis, death following twelve days after the last operation.

The autopsy revealed a fibrino-sanguinous deposit on the inner surface of the dura and of the right middle and posterior cranial fossæ, a purulent deposit in the pia at the base of the temporal lobe and base of the cerebellum. Section of the right cerebellar hemisphere disclosed a small abscess. The sinus contents were normal with the exception of the right transverse sinus which contained a recent non-infectious clot.

DESCRIPTION OF ILLUSTRATIONS.

- FIG. 1. Exposure of the sinus and bulb from the mastoid process showing a sulcus which is open externally after resecting the lateral and posterior external wall. Sharp angular transition from sinus to bulb; mastoid apex remains.
- FIG. 2. Exposure of the same structures from the same position as in Fig. 1. Secondary removal of the mastoid apex to show origin of the common jugular vein (practically identical with Grunert's procedure).
- FIG. 3. Exposure of the bulb from the external auditory canal according to Piff.
a. With remaining bony layer over the bulb.
b. For resection and depression of this layer.
- FIG. 4. The temporal bone divided in the level of the floor of the tympanum to show the position of the jugular fossa.
a. As regards the floor of the middle ear.
b. The mastoid process.
c. The sinus.
d. The carotid canal.
e. The facial nerve.
- FIG. 5. A similarly divided temporal bone to demonstrate the same conditions.

Fig. 1.

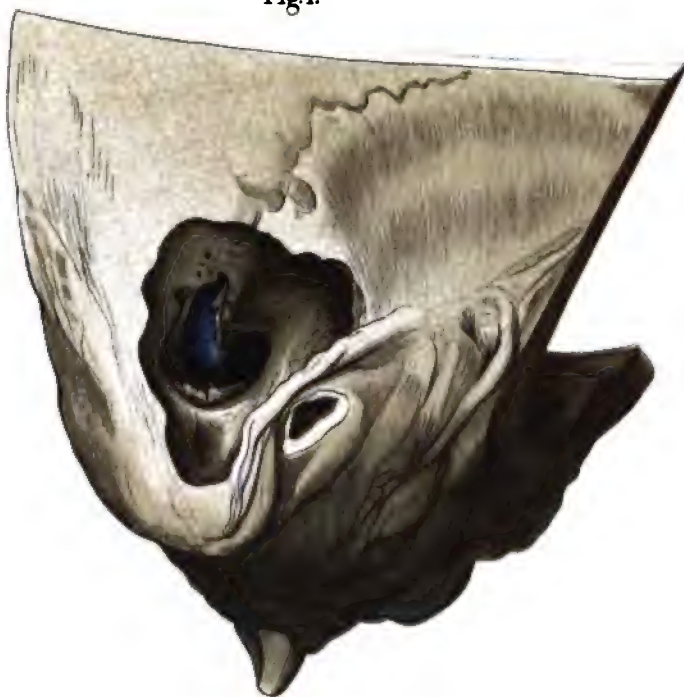


Fig. 2.

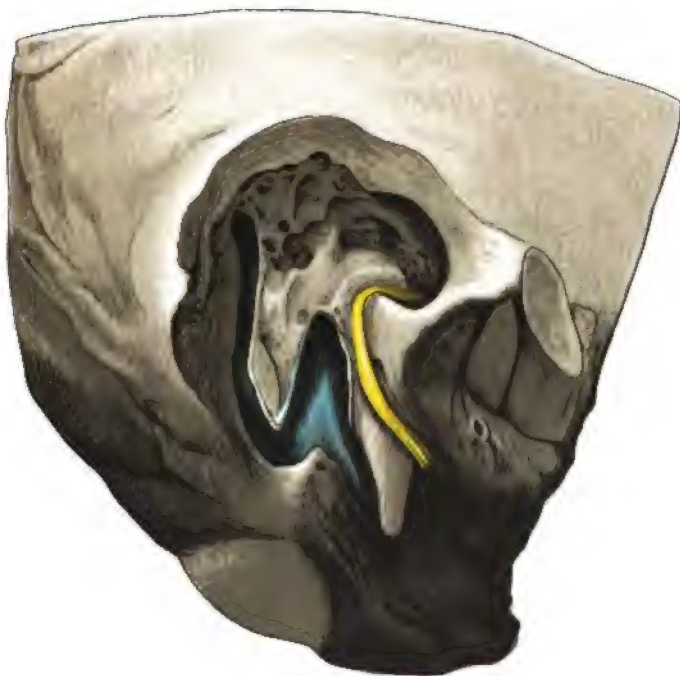




Fig. 3^a

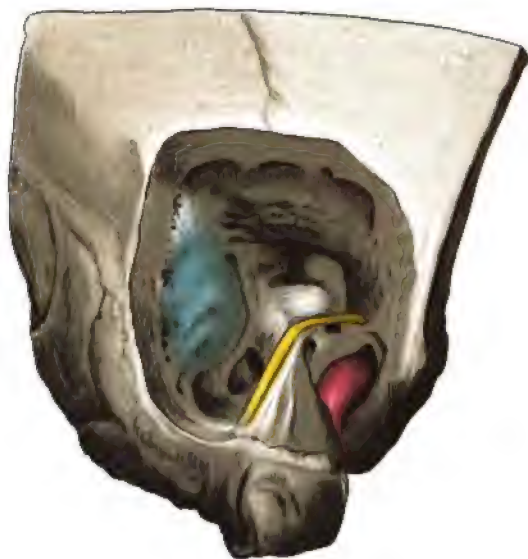
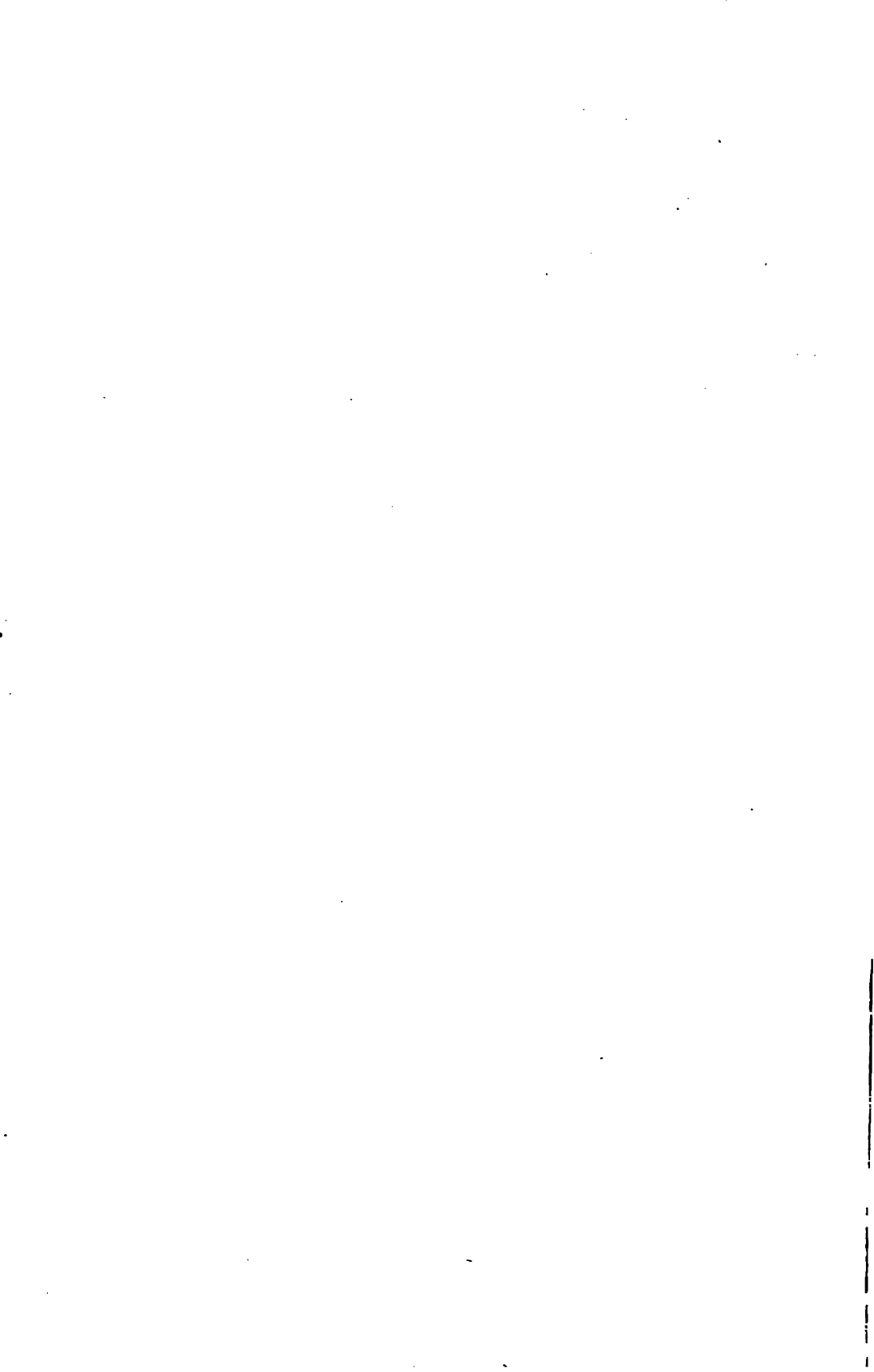
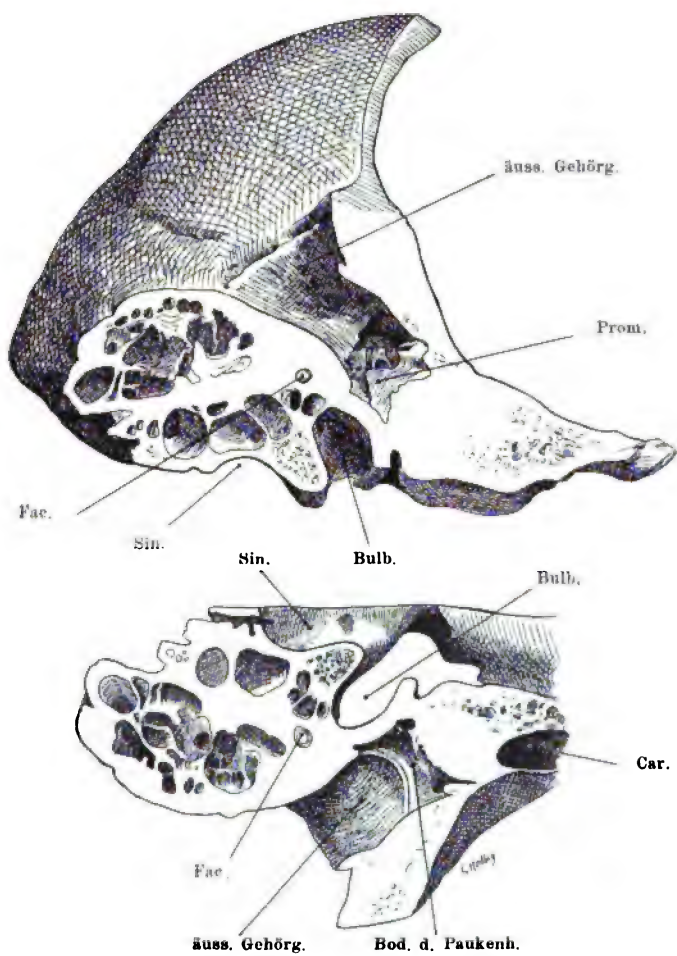


Fig. 3^b

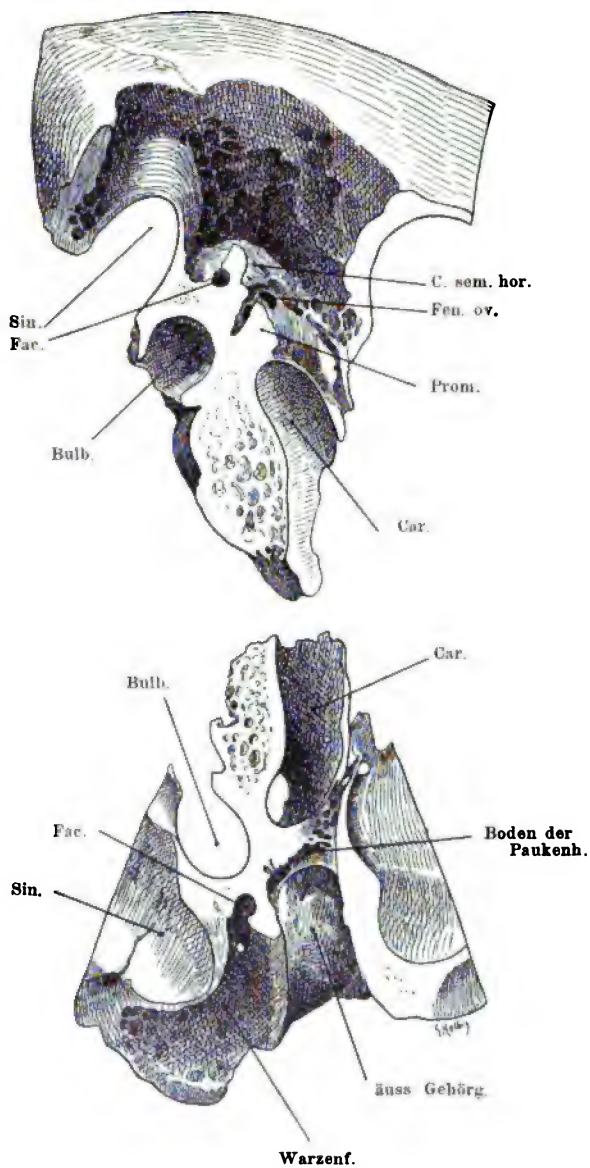




Figur 4.



Figur 5.





CRITICISM OF DR. VOSS'S ARTICLE ON THE
SURGICAL EXPOSURE OF THE
JUGULAR BULB.

BY PROF. GRUNERT, HALLE, GERMANY.

REPLY BY DR. VOSS.

Translated by Dr. ADOLPH O. PFINGST, Louisville, Ky., from the
Zeitschrift f. Ohrenhkl, Vol. XLIX., Nos. 1, 3, and 4.

BELIEVING that Dr. Voss was laboring under a misapprehension relative to the operation suggested and performed by me to expose the jugular bulb, I feel called upon to reply to his article in the *Zeitschrift für Ohrenheilkunde*, vol. xlviii., No. 3. In my original publication, I made the statement that the base of the skull is approached by blunt dissection until the outer edge of the jugular foramen is reached. The bridge of bone separating the jugular foramen and the previously exposed outer wall of the sinus is then removed with bone forceps. The facial at its exit from the stylo-mastoid is endangered by the forcible traction of the soft parts forward made necessary to expose the vein. The exposure of the bulb is brought about just as in the method described by Voss, by continuing downward and inward along the sinus, and not as Voss interpreted my description, by making an independent incision through the soft parts at the base of the skull. As evidence of this I would cite the following description from one of my cases.¹ "The sinus was exposed by removing the outer bony wall as

¹ *Arch. f. Ohrenheilkunde*, liii., p. 294.

far as the jugular bulb, then by removing the outer wall of the jugular foramen the bulb was fully exposed and incised."

Similar descriptions accompanied the report of other cases.¹

I wish also to correct the impression that the removal of the outer wall of the jugular foramen is always necessary to expose the bulb and would call attention to the paragraph of my original article in which the statement is made that in a number of cases the bulb can be sufficiently exposed to allow incision and the removal of thrombosed masses without disturbing the jugular foramen. As this could only be done by approaching the bulb from the sinus, it can be cited as further evidence that my method of operation does not expose the bulb by approaching it from the base of the brain, but by following along the sinus wall. In other words, I can see no steps in Voss's operation that were not embodied in my previous description.

Regarding the danger of injuring the facial nerve, which according to Voss can hardly be avoided in operating by my method, I need only state that the nerve was injured but once in the eleven cases operated upon by me and that the paralysis in this case was slight and of very short duration. Attention was merely called to the danger of injury of the nerve to point out the best way to avoid such an accident.

In defence of the other disadvantages claimed by Voss for my operation, I can say that the possibility of an unsightly scar comes in question only in those cases of extensive thrombosis where it becomes necessary to incise and freely expose the interior of the sinus bulb and internal jugular vein. In consideration of the gravity of these extensive cases, the question of scar formation sinks into insignificance. In the less extensive cases the soft parts are not encroached upon to the same extent

¹ *Arch. f. Ohrenheilkunde*, lvii., p. 32. *Ibid.*, lvii., p. 34.

and the scar formation should be identical to those resulting from the operation described by Voss.

Dr. Voss's Reply to Grunert's Criticism.

Briefly replying to the publication of Grunert,¹ I would state that his procedure and mine have a common object of exposing as far toward the central end as possible. However, I maintain that several advantages are possessed by my method of operation. Grunert, as he himself says, unites the incision in the soft parts behind the ear with the one made in ligating the jugular in such cases where ligation of the vein is undertaken, and after removing the tip of the mastoid dissects away the soft parts at the base of the skull, until the lateral boundary of the jugular foramen is reached.

In my method an extensive elongation of the wound in the soft parts never becomes necessary, the original mastoid incision sufficing to fully expose the bulb, the posterior wall being exposed by removing a narrow portion of bone on the median side and above the level of the lowest of the sinus. This small ridge of bone cannot be removed in doing the Grunert operation until the edge of the jugular foramen has been reached. Removal of the mastoid tip is not necessary in my operation but may or may not be done according to indications.

Another difference in the two operations is that Grunert converts the open sinus, bulb, and vein into a common cavity or gutter, whereas I extend this only over the sinus and bulb. Whenever the ligation of the jugular does not become necessary, the vein is left undisturbed, or can be cleaned through the open bulb. Should opening of the previously ligated jugular become desirable, it can be accomplished subsequent to opening the sinus and bulb and removal of the mastoid tip. Ligation of the vein seldom becomes necessary.

¹ *Zeitschrift f. Ohrenhkk.*, xlix., No. 1.

While the choice of instruments in performing an operation ~~differs widely~~ with the individual, I wish to state that Luer's forceps and broad ~~chisel~~ used by Grunert have been practically useless in my hands, and I would caution against their use. By their use there is greater danger of injuring the facial nerve and more bone is exposed than by my method, thereby exposing the cerebellum or the horizontal semicircular canal.

It has not been my object, in this reply to Grunert's article or in my former publication, to lay claim to priority to the suggestion of exposing the bulb through the mastoid bone, as Jansen must be given credit for this. Some time before Grunert's publication, Jansen pointed out the fact that in cases of well developed mastoid processes the bulb could readily be exposed by reaching it through the bone.

I also claim no priority to describing the method of reaching the bulb, for the details of the technique were first described by Grunert, who also outlined the indications for the operation. I have merely made some changes in the operative procedure which seem to me to simplify the operation, besides presenting the other advantages spoken of.

ON VERTIGO AND DISTURBANCE OF EQUILIBRIUM IN NON-SUPPURATIVE DISEASES OF THE INTERNAL EAR.

BY DR. WITTMACK, GREIFSWALD.

Abridged Translation from *Zeitschr. f. Ohrenhkl.*, Vol. L., No. 2, 1907.

IT is the purpose of this paper to determine to what extent it is possible to diagnosticate diseases of the inner ear by means of the presence or absence of characteristic functional disturbances. The functions of the labyrinth can at the present day be accepted as being, for the cochlea the perception of sound, and for the semicircular-canal apparatus the preservation of the bodily equilibrium. The significance of some of these symptoms and the part of the apparatus which is chiefly involved and in what way the nerve terminals are irritated are still disputed points, but not of great practical importance.

The clinical observations of the aurists have confirmed in general the experimental investigations of the physiologists. The advances in operative ear surgery have aided our knowledge in this direction. It can be assumed as definite that when the cochlea is destroyed complete deafness results. Injuries and irritation of the semicircular canals always produce distinct disturbance of equilibrium. Everybody can observe during an operation the marked symptoms by which an injury of the semicircular canal is followed. The sequestration of a

part of a semicircular canal by suppuration or the perforation of a purulent process from the middle ear into the labyrinth always causes distinct disturbance of equilibrium and vertigo. Whenever the symptoms have not occurred, the methods of examination have been faulty, or the examination has taken place at a deferred date when, by means of the labyrinth of the other side, the eyes, or the cerebellum, the lesion has been corrected. We rarely fail to find in the history marked attacks of vertigo, and when we look for symptoms of defect (rotation vertigo and galvanic vertigo), we are generally able to determine the loss of the semicircular canals.

It is therefore evident that the labyrinth possesses two important functions, that of sound perception and that of the regulation of bodily equilibrium. Disturbance of either of these from morbid processes must give rise to characteristic symptoms of defect or of irritation.

The presence of disturbances in the semicircular canals has received but little attention in diseases of the internal ear not depending upon suppurations. Only in that most severe form, the so-called Ménière's disease, has this examination been regarded. The slighter degrees of functional disturbance of the semicircular canals which can be discovered only by special examinations differ from the severe form only in grade, and, in the presence of a disturbance of hearing characteristic for internal-ear disease, they can be regarded as definite signs of a disease of the labyrinth. The difference in the intensity of the symptoms can be explained by the difference in severity of the fundamental pathological process. It is presumable that in the labyrinth pathological processes generally occur in the form of small multiple morbid foci, in the form of small hemorrhages or inflammatory exudates or infiltrates, situated within the delicate membranous labyrinth. Then there may be serous exudates in the peri- or endolymphatic cavities of the entire labyrinth. The presence of bloody extravasations throughout the

entire labyrinth, which was formerly regarded as the cause of Ménière's disease, is, to my mind, only possible from a traumatism with fracture of the labyrinth capsule. When the labyrinth is filled with a serous exudate, or if the lymphatic circulation is suddenly interfered with, intense symptoms of irritation should be present. These cases should appear under the picture of Ménière's symptom-complex. From many of the autopsy reports of cases which were diagnosticated as Ménière's disease, it seems to me that a serous exudate or a sudden disturbance in the lymphatic circulation may have produced the symptoms. These pathologic changes, of course, cannot be recognized on examination with the microscope after death.

The occurrence of many small infiltrates will produce much less marked symptoms than when there is an extravasate occupying the entire labyrinth. We need only remember how easily the semicircular canals react to the slightest irritant. It seems incredible that these small infiltrations could be present without causing manifest symptoms, just as an isolated involvement of that part of the membranous labyrinth devoted to sound perception seems unreasonable.

To diagnosticate disease of the labyrinth, there should be a functional disturbance in the sound-perceiving as well as in the apparatus for preserving the equilibrium.

In the examination of the cases known as nerve deafness, whose seat is in the internal ear, especially as regards the presence of disturbances in the semicircular canal, it is astonishing, notwithstanding careful examination, how few cases present any disturbance of this kind. It is perfectly possible that in cases which have existed for a long time, or which have not been examined during the acme of the disease, these symptoms would be difficult to show, but, on the other hand, we miss in a large number of these cases any notes of vertigo in the previous history. If vertigo is mentioned, it is frequently not a

characteristic labyrinth vertigo. At the same time, it seems impossible that at the height of the disease, and on proper examination, a disease of the semicircular canals should not cause characteristic symptoms. Many authors have called attention to the anomaly of pronounced disturbance of hearing with the absence of all disturbance of equilibrium in many cases of nerve deafness, and a satisfactory explanation has not been offered. I have had the opportunity of examining pathologically a case of nerve deafness which furnishes the necessary explanation.

In this case of nerve deafness where, in the complete absence of symptoms on the part of the semicircular apparatus, in a few weeks the patient became completely deaf and at the acme of the disease was examined pathologically, a degenerative neuritis was found localized to the cochlear branch of the auditory nerve. A similar condition has been described in other cases of atrophy of the auditory nerve where a more marked and exclusive involvement of the cochlear branch is mentioned.

If we regard this isolated involvement of the cochlear branch as the rule, and that cases of nerve deafness without any symptoms on the part of the semicircular apparatus should not be regarded as diseases of the labyrinth but as diseases of the cochlear branch, or generally speaking of the auditory nerve, we immediately see why there is a difference between the disturbances in hearing and the disturbances in equilibrium in certain cases of nerve deafness, and that we have here a diagnostic means to distinguish between the diseases of the auditory nerve and of the membranous labyrinth. On the other hand, we have never found a case where there was disturbance of equilibrium related to the semicircular-canal system without simultaneous disturbance of hearing as proving the possible existence of isolated disease of the vestibular nerve. If this does occur, it surely is very unusual, while isolated affections of the cochlear nerve are relatively frequent.

It is not strange that a particular group of nerve fibres should be affected. This can be observed in the fibres of the recurrent nerve, of the optic nerve in tobacco amblyopia, in typical lead poisoning, etc.

It is possible that disease of the vestibular nerve does not produce the same symptoms inflammatory irritation of its end apparatus does. Though this point has not been settled, the experimental division of this nerve speaks distinctly against this supposition.

It is, of course, impossible to solve this question from the pathological examination of a single case. As the cases suitable for examination are extremely infrequent, I have endeavored to confirm this opinion by a study of clinical cases, and it has seemed to me that the clinical observations confirm this view.

I wish to describe the following clinical observations in which I have tried to differentiate cases of nerve deafness into diseases of the auditory nerve and diseases of the labyrinth.

The diagnostic aids which we possess for determining functional disturbances in the sound-perceiving and the semicircular-canal apparatus are the following:

In the hearing examination it is customary to pursue the following course: The hearing distance for whispered numbers is first tried, then the hearing for a C₁₂₈ tuning-fork by air and then by bone conduction, then the original Rinné experiment and Weber. The quantitative hearing for a higher fork by air conduction is next determined. For this purpose, we usually select a C⁴ fork. Then the determination of the lower- and upper- tone limits, with the occasional mapping out of a hearing relief.

The diagnosis of an affection of the sound-perceiving apparatus depends upon the following points: relatively good perception for deep, decidedly poorer perception for high tuning-forks by air conduction, good lower-tone limit with marked contraction of the upper limit, dim-

inution of the perception for the tuning-fork by bone conduction, and a positive Rinné.

It is of particular importance to observe the relation of the upper- to the lower-tone limit. The lower-tone limit need not be always normal, but the upper should be contracted in proportion to confirm a diagnosis of disease of the sound-perceiving apparatus. When the disturbance of hearing has not become marked enough to show a contraction of the upper- and lower-tone limits, we can compare the quantitative hearing for the deep C 128 fork with that for the C⁴ fork. We have never found in diseases of the internal ear, aside from deaf-mutes, a well-defined defect of one or several tone areas. There has always been a gradual transition from the most abbreviated tone area to the adjoining one, which is self-evident if we take into consideration the anatomic conditions in Corti's organ. We have, therefore, replaced the graphic representation of Bezold by the graphic representation of the results of our examination in the form of a curve. We have also been satisfied with the determination of percentage hearing durations. The absolute values obtained by the quantitative perception for individual tones are of less importance than a comparison of these results with one another. Another important point for the diagnosis of disease of the sound-perceiving apparatus is a reduction of the perception by bone conduction. A diminution of bone conduction seems to us to be of diagnostic value when it amounts to 30-40% of the average. The outcome of Rinné's test is also of importance, though there are certain modifying conditions, such as cases of marked deafness or complete deafness. In these, when the deafness is produced by disease of the internal ear, Rinné is generally negative. As Bezold says, the negative Rinné in one-sided disease should be disregarded.

Weber's test is of little value for the diagnosis of disease of the sound-perceiving apparatus, and Gellé's test is too uncertain.

We have made a number of experiments with the galvanic reaction of the auditory nerve for diagnostic purposes, and believe that a positive reaction, when it occurs during a current intensity of 10-8 M.-A., confirms the diagnosis of disease of the internal ear, because in the other diseases, otosclerosis and chronic middle-ear catarrh, it is very exceptional to obtain a positive reaction by this relatively low-current intensity.

In addition to the hearing examination, there are other points to be considered: the negative otoscopic condition, the patency of the tube, the presence or absence of subjective noises. This last symptom is of value in case the three following conditions are fulfilled: the tone must be high, continuous, and very loud. This is always suggestive of a disease of the sound-perceiving apparatus, especially of the auditory nerve.

The diagnosis of functional disturbances of the apparatus for preserving the equilibrium is still less definite. It has been shown that injury of the horizontal canal causes characteristic disturbances of equilibrium, and we may inversely believe that the presence of these symptoms denotes a functional disturbance of the semi-circular apparatus. These symptoms are nystagmus, disturbance of equilibrium, vertigo, and vomiting. Occasionally it has seemed to me that a dilated pupil on the affected side was an associated symptom. If these symptoms occur with severity and with tinnitus, they are regarded as Ménière's symptom-complex; if they appear moderately, or are only present on direct examination, very little importance has been given to them in non-suppurative diseases.

The nystagmus is peculiar in that it is more pronounced when the eyes are turned to one side, usually toward the healthy side rather than toward the affected side. It is also generally horizontal in character. Nystagmus is a definite symptom of labyrinth disease when, with each attack of more pronounced subjective vertigo, it also

increases in its intensity. In other words, there is a direct proportion in the intensity of the nystagmus and the subjective vertigo.

The significance of subjective vertigo must be more carefully described. On injury or irritation of the labyrinth the sensation of vertigo is usually that of a characteristic rotatory vertigo (carrousel vertigo). We can only regard vertigo as an aid to the diagnosis of disease of the semicircular-canal apparatus when it is present in the form of the typical rotatory vertigo—in other words, when we learn from the patient that he has the impression as if he or the surrounding objects turn. This is especially important because we have previously seen that it is just this presence or absence of vertigo relative to a labyrinthine disturbance which is of differential diagnostic importance between affections of the labyrinth and of the auditory nerve. If the vertigo is only experienced as an operation in the head, especially on bending over or on bodily exertion, or appears as a mild, indefinite staggering, or simply a weakness, we are not entitled to consider it to be an evidence of labyrinth disease.

For the objective proof of functional disturbances of the apparatus of equilibrium in the labyrinth, v. Stein's experiments have been fundamental. At the same time, the examination for vestibular disturbance of equilibrium requires a due regard for the individual peculiarities, the ability of the patient to perform physical exercises, especially the complicated movements, more than the hearing tests. We are inclined to lay more importance upon the observations of the ordinary gait, with open and closed eyes, and the condition of the patient while standing on an inclined plane. The latter is especially of value for the diagnosis of a disturbance in the equilibrium organ, because we have seen old and clumsy people nevertheless maintain themselves steadily on an inclined plane when they possessed a healthy labyrinth. To determine the exact degree of inclination by figures offers diffi-

culties, and we are more inclined to judge from the general impression which a patient suffering with labyrinthine disease makes while standing on an inclined plane. The timid swaying and attempts at balancing are of greater diagnostic importance than the determination of the angle of inclination. If we wish to designate this angle, it is more correct to determine that point at which distinct swaying begins rather than the angle at which the swaying is so strong that the patient is not able to maintain the upright position.

Examination for rotatory and galvanic vertigo has been made in the case of deaf-mutes by a number of authors. These have shown that a number of deaf-mutes do not possess rotatory or galvanic vertigo. This is unquestionably due to a defect in the labyrinth, and is proven by the observations which have been made in cases where the labyrinth is missing. I have recently had the opportunity of examining a case where the entire labyrinth was lost without there ever having been any symptoms of irritation on the part of the semicircular canals. Examination for rotatory and galvanic vertigo showed most distinctly the destruction of the labyrinth.

While the examination (nystagmus, subjective attacks of vertigo, and objective disturbances of equilibrium) shows us evidence of an irritation of the semicircular-canal apparatus, and can, therefore, be applied in the cases which are examined at the beginning or at the acme of the disease, the examination for galvanic and rotatory vertigo may show a defect in the labyrinth in old cases where the labyrinth disease has long come to a cessation, or cases in which the labyrinth has become obliterated.

We are able to show disturbances in the function of the apparatus in the labyrinth which governs the equilibrium just as well as we can determine functional disturbances in sound perception.

The case-histories follow in detail (pp. 142-165).

If we review these case-histories, we find that they

represent two groups of diseases of the inner ear which are distinctly to be separated. One group is characterized by the entire absence of disturbance of equilibrium and subjective vertigo, but hearing disturbances are pronounced. In the second group the disturbances of equilibrium are more or less pronounced. A number of the patients belonging to the second group sought aid, not on account of the deafness, but on account of the severe vertigo. Others would not have sought aid on account of their ears, as they associated this trouble with the general condition.

These two groups of diseases of the inner ear are different not only from the absence or presence of vertigo and vestibular disturbances of equilibrium, but there are other points of difference.

First, there is the course of the disease. The cases in the first group, which we will call the diseases of the auditory nerve, are characterized by a progressively uniform course. If the case is severe—in other words, associated with severe nerve or general lesions, the course was usually a rapidly progressive one and the deafness, after a few weeks, was marked. The course of the cases in the second group, on the other hand, which we will call diseases of the labyrinth, was characterized by the presence of attacks. There is a distinct history of more or less severe attacks, then intervening periods of quiet with general improvement and diminution of the symptoms.

Another important difference is in the hearing examination. The cases of the first group show, with a relatively good lower-tone limit, a contracted upper-tone limit, and, consequently, a much better hearing quantitatively for the deep forks than for the high ones. The hearing curve diminishes continuously with the increase of the pitch, which is, of course, a condition characteristic for nerve deafness. In the second group the contrast between the lower- and upper-tone limits is not so pro-

nounced, and the quantitative perception for C approached C⁴, though, otherwise, the site of the disease was to be placed in the inner ear. The hearing for tones of the middle series is very much reduced, so that the curve is at this point at its lowest and then again increases with the increase in the pitch. A defect in the tones of the middle series in nervous deafness has been observed by other authors. Gradenigo believes this condition to be a characteristic for diseases of the auditory nerve. This would not agree with our ideas. I am inclined to believe that diseases of the labyrinth, as opposed to diseases of the nerve, are characterized by this peculiarity. The aural examination does not explain what form of disease causes the lesion of the auditory nerve or of the labyrinth. We cannot separate neuritis from nerve degeneration or a labyrinth lesion in a nephritic patient, or in any other disease. Examination of the general condition gives us the necessary information.

I propose to classify the first group of diseases as affections of the auditory nerve, or, more properly, degenerative neuritis of the auditory nerve, and leave the question open, whether there exists simple degeneration of the nerve fibres or a nerve-fibre atrophy following interstitial inflammatory changes of the nerve. In the cases which run a mild course and have an insidious beginning, and where the hearing disturbances are not so intense, the term "partial degenerative neuritis of the auditory nerve" is appropriate. These cases of degenerative neuritis may then be further divided according to the variety of fundamental diseases. The same classification can be applied to the cases of labyrinthitis. It is extremely important in all these cases of nerve deafness to determine the fundamental general disease.

Since we have examined cases of nerve deafness with a view to determining the presence of an existing general disturbance, the examination of these cases has been

very much more gratifying. If we can determine systematically from the aural examination a previously not recognized case of tabes, or a previously not observed general disease, the examination of the ears will shortly be of as much importance as that of the eyes. At the same time it must be mentioned that there were cases where a general disease could not be determined, but they were those which were not observed long enough, and it is perfectly possible that the auditory lesion was an ear symptom of commencing nerve trouble. In the cases of otosclerosis where a differential diagnosis against these cases of nerve deafness is of great importance, I have never been able to find a general disease, with the exception of cardiac trouble, which seems to me to be unusually frequently associated with otosclerosis; there never was anything pointing to syphilis. The general diseases which are liable to cause disease of the auditory nerve or of the labyrinth are, of course, very numerous. As regards the disease of the nerve, it must be remembered that we cannot clinically distinguish between wasting of the nerve, nerve atrophy, from infiltration of the nerve and neuritis. We must not only look out for disease of the nerve system, as, for instance, tabes, but for all the diseases which may be regarded as causes for the onset of a neuritis or a perineuritis. These are, briefly: the acute intoxications (salicylate of soda and quinine), the chronic intoxications (alcohol and nicotine), acute infectious diseases, syphilis, and tuberculosis, constitutional anomalies (diabetes, Basedow's disease, gout), and finally disturbances of the circulatory system, especially arteriosclerosis and myocarditis. As causes for a labyrinth disease, those affections are of importance which throughout the rest of the body, especially in the ocular fundus, may cause the presence of multiple diseased foci. These are especially syphilis, chronic nephritis, leukæmia, pernicious anæmia, etc.

It is therefore evident that the variety of fundamental

disease also gives us a differentiation between labyrinth and nerve lesions.

I should like to add a few remarks on two other forms of nerve deafness, the professional and senile deafness, which should also be grouped among the nerve diseases.

As a result of the hearing tests, the pathological site of these diseases is in the inner ear. I have examined a number of these cases for the presence or absence of disturbances of vestibular equilibrium with the use of all of the above-mentioned diagnostic means, but I have never been able to determine any objective symptoms on the part of the vestibular apparatus. In almost all cases there was no complaint of subjective vertigo. In cases of senile deafness, however, I have observed these complaints, but, on closer examination, the vertigo was a simple sense of weakness, never a typical rotatory vertigo. The course of these cases corresponds entirely to the milder forms of the above-described nerve diseases. The hearing curves are also similar. The autopsies which have been made in these forms of deafness are very infrequent. As far as I have been able to find, a case has been examined by Habermann and another one by Alexander. The conditions found by these authors commenced with a primary nerve disease in professional and senile deafness.

Regarding the professional deafness, I should like to mention that I have been able to experimentally produce every distinct degenerative destruction of the nerve fibres and the associated nervous cells in the auditory nerve. These will be reported upon more extensively subsequently.

If we place the lesion in professional deafness in the nerve, the similarity of the two diseases would justify placing the lesion in the senile deafness also in the nerve. In the former case there is a disintegration of the nerve fibre through the injurious action which the source of sound exerts on the nerve; in the second,

there is disturbance in the nutrition of the nerve from arteriosclerosis.

I should like to mention here that, notwithstanding systematic examination, I have never observed a disease of the auditory nerve which resembled the choked disk of the optic nerve. In a number of cases where pronounced optic neuritis followed a variety of endocranial diseases, distinct disturbances of hearing were not present, which might be caused by an analogous disease of the auditory nerve. The explanation of why this disease does not occur in the auditory nerve may be found in the anatomical conditions. Most of the venous blood and the lymph passes from the aqueduct of the cochlea into the jugular vein. An increase of the endocranial pressure cannot cause a congestion in the blood and lymph-vessels of the labyrinth. An important point is the question why, with a large number of cases of disease of the auditory nerve, which are found associated not with nerve diseases but with general diseases, no other nerve apparently presents analogous changes. The anatomical conditions, I think, explain this question, and they also explain why the cochlear branch is more apt to be involved while the vestibular branch remains more or less free. The cochlear branch, with its associated cochlear ganglion, is imbedded in an unyielding bony capsule partly surrounded by broad lymphatic spaces. The blood-vessels which serve to nourish this structure are end arteries. The ganglion cells of the cochlear ganglion are, moreover, very much smaller than all other ganglion cells in the vertebrates. They are, moreover, bipolar and possess medullary membranes. These are extremely important peculiarities from a pathological standpoint, some of which give the cochlear branch an individual position. Some of these, the small size of the ganglion cells and the presence of medullary membranes, suggest that there is a retarded development. These anatomical relations show the elective vulnerability of

the cochlear nerve to toxic substances or to an interference of the circulation by endarteritic processes.

Politzer has also been struck by this elective vulnerability of the auditory nerve. The vulnerability of the cochlear branch, however, which has been emphasized in this paper, has not been sufficiently appreciated, though we have autopsy records of cases of atrophy of the auditory nerve with a more pronounced involvement of the cochlear branch.

In conclusion I should like to mention how we can distinguish between this disease of the auditory nerve and other affections of the auditory nerve which result from the extension of a pathological process from the surrounding tissues to the nerve (meningitis, tumors, etc.). In these cases, of course, the elective vulnerability of the cochlear branch is of little importance. Both branches, the cochlear and the vestibular, must be involved to about the same degree. Under certain conditions the symptoms of a labyrinth disease may be simulated, unless we have other symptoms which point to an auditory nerve lesion, such as simultaneous involvement of the facial nerve. Owing to the close relationship of these nerves, an extension to the latter nerve is to be expected. If we study the literature on diseases of the auditory nerve by tumors, we find in most cases deafness, vertigo, and facial paralysis. In some cases there is no mention of vertigo or disturbance of equilibrium; in a small part there is no lesion of the facial nerve.

To recognize the disturbances which are situated more centrally, the associated involvement of the surrounding nuclei centres and tracts furnish additional information.

The results of this investigation are, briefly, as follows:

Diseases of the inner ear not depending upon suppurations fall into two large groups which can be separated into labyrinth diseases and auditory-nerve diseases, according to the presence or absence of characteristic disturbances of equilibrium, by the clinical course and

the form of hearing curves. The absence of disturbance of equilibrium in diseases of the auditory nerve is caused by the isolated or preponderating involvement of the cochlear nerve. Most of these diseases depend upon a general or a nervous disease. This is especially true for diseases of the auditory nerve. A disease of the auditory nerve, moreover, produces senile deafness and professional deafness. The elective vulnerability of the cochlear branch is based on its peculiar anatomic conditions.

ON CHRONIC PROGRESSIVE LABYRINTHINE DEAFNESS.

BY PROFESSOR PAUL MANASSE, STRASSBURG.

Abridged Translation from *Zeitsch. f. Ohrenhkl.*, Vol. LII., 1906.

CHRONIC progressive deafness means a disease depending upon otosclerosis or stapes ankylosis, which the investigations of Politzer and Siebenmann have found to result from pathological changes in the bony labyrinth. Stapes ankylosis presents clinically the picture of middle-ear deafness. It means deafness following a disturbance in the sound-conducting apparatus. On the other hand, we are perfectly familiar clinically with another variety of progressive deafness which exhibits the signs of disturbance of the sound-perceiving apparatus, the so-called nerve deafness. This condition has been but little studied anatomically and so is regarded as uncommon. It is, however, very frequent, as the following investigations show.

At the last Congress of German Otologists in Homburg I described the pathology of this disease under the name of Chronic Progressive Labyrinthine Deafness, based upon the microscopic examination of 24 temporal bones obtained from 14 individuals. I am now able to extend this publication and add many of the features which had to be omitted in that publication. It is at the present time impossible to give a complete picture of this disease. I hope this contribution will serve as a groundwork for others to build upon, so that at a not very distant date

the so-called nerve deafness will be an anatomically and clinically well characterized entity.

At the beginning of my investigations I examined every temporal bone of persons suffering from chronic progressive deafness. I have examined up to the present day 36 temporal bones belonging to 22 individuals with chronic progressive deafness. Of these, 3, belonging to 2 individuals, presented stapes ankylosis with spongification; 2, in 2 individuals, stapes ankylosis by calcareous or connective-tissue new formation; and the remaining 31 temporal bones, belonging to 18 patients, showed the changes in the labyrinth and auditory nerve which are now to be described.

I have separated the temporal bones which showed changes without any lesion of the middle ear from those which presented, in addition to the labyrinth disease, a chronic otitis media or remnants. Without wishing to suggest that the middle-ear disease has had anything to do with the causation of the labyrinth disturbance, I have added to the cases of straight labyrinthine disease those cases which presented on the two sides the typical changes of a disturbance of the sound-perceiving apparatus and on one of the sides either an acute or a chronic otitis media, as it is self-evident that the one-sided middle-ear affection has had no relation with the double-sided labyrinth disease. The microscopic details of the 31 cases are found on pages 3-33 of the German original.

The anatomic changes are then carefully described on pages 33-49. The results of the anatomic investigation of these 31 labyrinths are summarized as follows:

1. Corti's organ, including the membrana tectoria, was found atrophic to a stage of complete aplasia at the cochlear duct and its immediate surroundings; dilatation or constriction of the duct by distension or collapse of Reissner's membrane, hydropic degeneration of the spiral ligament, connective-tissue new formation at the lower

extremity of the stria vascularis, connective-tissue and bone formation in the perilymphatic spaces, occasional atrophy of the intervening walls; constant accumulations of pigment cells in the modiolus and the rest of the cochlea.

2. In the spiral ganglion, the ganglion cells were diminished in number and shrunken. Empty spaces or connective-tissue new formation were found in their place in Rosenthal's canal.

3. In the smaller nerve channels, the nerve fibres were found atrophic up to a condition of complete disappearance and connective-tissue new formation within the bony channels (perineuritis).

4. In the auditory nerve, atrophy and chronic neuritis were present partly with new formation of connective tissue in the nerve.

We, therefore, have found the same changes in all of the four places: atrophy of the preformed nervous structures replaced by more or less well-developed connective-tissue formation, representing a process characterized by atrophy and chronic productive inflammation.

Of especial interest was Case 12, where, in addition to the changes in the auditory nerve and in the labyrinth, a partial beginning spongification of the labyrinth capsule was present. This is of interest especially as Siebenmann has reported a case of stapes ankylosis with acoustic neuritis, and Alexander cases of deafmutism where partial spongification of the labyrinth capsule was observed in addition to the labyrinth atrophy. We must assume that the primary change in this condition occurs in the auditory nerve and that the other parts, especially Corti's organ, are secondarily affected—in other words, the disease begins centrally and extends in a peripheric direction.

Clinical Remarks

Regarding the clinical aspect of my cases, I confess

that my report is incomplete, as many of the temporal bones were old and labelled sclerosis or deafness, and in many a definite examination of the hearing and of the equilibrium could not be undertaken. Moreover in some of the cases there was in addition a middle-ear trouble on one or the other side, thus masking the picture of a distinct nerve deafness.

The 31 temporal bones furnish us with the following clinical data:

The frequency of chronic progressive labyrinthine deafness must be unusually great. If we consider that I have examined all the cases of progressive deafness that I could lay my hands upon, and of the 36 temporal bones (22 cases) only 3 (2 cases) were examples of spongification and 2 (2 cases) of stapes ankylosis from calcareous connective new formation, so that 31 labyrinth deafnesses (18 cases) remain, I feel justified in assuming that this disease is very frequent—possibly the most frequent form of chronic progressive deafness.

I can say very little definite about the etiology. In general it may be said that the simultaneously existing general disease must be regarded as the cause. This in most of our cases was advanced age, with the associated arteriosclerosis. In four cases there was general tuberculosis, in one each syphilis, chronic nephritis, cholelithiasis, general sarcomatosis. In a small number the general disease could not be determined. Possibly the middle-ear conditions are of some importance in causing the atrophy. It is striking that in those cases in which, in addition to the labyrinth atrophy, one-sided middle-ear disease was present, the atrophy was always more marked on the side of the diseased middle ear. The age was usually advanced. Ten of the 18 patients were in the seventh to the ninth decades; the youngest patient was 26 and the oldest 84. As to the sex, the male sex unusually preponderated. Of the 18 individuals 15 were men and 3 women. The disease was always bilateral, and

ran its course under the picture of a chronic progressive deafness. There was usually a normal or nearly normal drum. Marked diminution of hearing for voice, and in those cases which could be well examined clinically the lower-tone limit was normal, the upper-tone limit depressed, bone conduction markedly abbreviated, Rin   positive. I am unable to say anything about the disturbance of equilibrium.

The clinical defects in this series of observations are supplied by a recent paper of Wittmaack's (*Zeitschr. f. Ohrenh  k.*, vol. 1., page 137, translated in this issue of these ARCHIVES, pps. 461-476) describing a number of cases which belong in this category where a careful examination of the hearing and equilibrium was made.

According to this author, to make a diagnosis of a trouble in the labyrinth it is absolutely necessary to discover a disturbance in the function of the sound-perceiving apparatus as well as in the organ of equilibrium. It is extremely remarkable that in many cases of nerve deafness disturbances of equilibrium were not observed. To explain this, Wittmaack cites a case of nerve deafness where a degenerative neuritis was found only in the cochlear branch. This is presumably the rule, because we may see almost every day many cases of nerve deafness without symptoms of dizziness. These are not to be regarded as diseases of the labyrinth but as diseases of the cochlear nerve. An isolated nerve deafness without vertigo would, therefore, help us in diagnosing diseases of the cochlear nerve. It must be taken for granted (1) that the cochlea is not alone diseased, (2) that the cochlea and the cochlear nerve cannot be diseased without involvement of the vestibular apparatus—in other words, that in every form of labyrinth disease as opposed to a disease of the auditory nerve the entire membranous labyrinth, comprising the cochlear and vestibular apparatus, must be involved. This, however, in my opinion, has not been proven. As an aid for this assumption, a

clinical observation is cited where an attempt was made to differentiate between cases of nerve deafness as diseases of the auditory nerve and of the labyrinth. A number of cases of nerve deafness in tabes, general syphilis, arteriosclerosis, phthisis, after acute infectious diseases, alcoholism, diabetes, Graves's disease, and concussion of the brain are described. Wittmaack found in all of these disturbances of hearing without involvement of the sense of equilibrium, and deduces an isolated disease of the cochlear nerve without involvement of the labyrinth. Then the cases are reported which present both forms of changes, disturbance of hearing and of equilibrium, which are regarded by the author as suggesting a disease of the labyrinth. He assumes that in these cases there are multiple foci in the labyrinth. In the pronounced cases with Ménière's symptom-complex, exudations may occur in the peri- and endolymphatic spaces. This is, of course, only a hypothesis. The first group are simply degenerative neuritis of the auditory nerve, the second group labyrinthitis, which, according to the general disease, are divided into tabic, alcoholic, diabetic, arteriosclerotic neuritis or labyrinthitis. The unusual vulnerability of the cochlear nerve is the reason why the cochlear nerve should be affected in these general diseases with the escape of all the other nerves including the vestibular branch.

If we compare this clinical arrangement with the anatomical cases which I have examined, we find that the second group, the labyrinth diseases, where the foci or exudates are situated in the labyrinth, are absent in our cases. As regards the first group, the degenerative neuritis which affects only the cochlear branch and where the two following conditions must be observed, namely, that the vestibular branch and the cochlea are comparatively uninvolved, after the appearance of Wittmaack's paper I went over my specimens carefully and I found that in a large number of the cases both branches, the cochlear

and the vestibular, were diseased to the same extent and that rarely the vestibular and more frequently the cochlear nerve was the one which was the more affected. It was noticeable that the terminations of the cochlear nerve, the ganglion and the terminal organs, were much more frequently diseased than the parts of the labyrinth which were supplied by the vestibular nerve. So that we may support the idea that the disease principally invades the cochlear branch, but not that in these cases the labyrinth and the vestibule remain intact. This disease cannot be regarded as purely a nerve affection unless we extend the idea of the cochlear nerve to include the nerve trunk, the spiral ganglion, the nerve terminals, and Corti's organ. We have assumed that the disease of the nerve is primary and the involvement of Corti's organ is secondary. The anatomic changes which are found present in the four places give a uniform pathological picture, so that we cannot speak of this deafness as an ordinary acoustic neuritis but as a disease of the cochlear nerve and of the cochlea. Theoretically it is self-evident that a labyrinth deafness can be explained by a combined disease of the cochlea and of the nerve as by an isolated affection of the nerve. In the one case of Wittmaack's which has been examined microscopically, the neuritis was found confined to the cochlear trunk. This was a case of acute deafness, but in our cases as well as in Wittmaack's clinical observations the deafness was always a chronic progressive one. It, therefore, seems very probable that these are two entirely different diseases. Wittmaack has brought no proof that the cases which are described by him clinically as of chronic nerve deafness resembled the cases of acute deafness which he has reported, and it is very probable that they represent the anatomic picture which I have demonstrated in the above cases. This holds particularly for those cases where there is a greater change in the cochlear nerve than in the vestibular nerve.

If we compare the results of Wittmaack's examinations with mine, we may say that the first opinion of this author which my investigations have confirmed is that in nervous deafness the hearing apparatus is principally involved and less frequently the organ of equilibrium. The second supposition, that the nerve trunk only is involved in the cases of the first group, holds good for only recently beginning cases in progressive disease where the cochlear nerve is affected. The third hypothesis, that in combined disease of the hearing and of equilibrium foci and exudates are present in the labyrinth, is not demonstrated. It is very likely that these diseases resemble anatomically my cases in which changes of the cochlea and vestibule and of the cochlear and vestibular apparatuses are present, and that the forms of disease are not different in kind but only in degree.

I should modify Wittmaack's views as follows: In chronic progressive labyrinth deafness the changes in the hearing apparatus preponderate over those in the organ of equilibrium. The disease begins presumably in the cochlear nerve. As regards the frequency of this affection, I have gone over the case-book in the Polyclinic during the last quarter, and have found that of 1033 new patients 52 suffered from chronic progressive deafness. Of these, 21 had the middle-ear deafness and 31 labyrinthine or nerve deafness. Of the latter, 24 showed only disturbances of hearing; in 7 these were combined with disturbances of equilibrium. This shows that (1) chronic labyrinth deafness is more frequent than stapes ankylosis; (2) the former shows relatively frequent disturbance of equilibrium.

Literature.

This affection is probably clinically familiar to every otologist and the reader should be referred to the chapter on nerve deafness in the text-books and to Wittmaack's

paper. There are also a number of anatomic observations. The condition which we so frequently observed in the cochlea resembles that found in an observation of Politzer's in a case of deafness following an acute infectious disease where there was also a large defect in the drum. In the cochlea replacing Corti's organ there were an epithelial exudate, absence of the nerve fibres in Rosenthal's canal, ganglion cells diminished in number, the protoplasm of the cells very much shrunken. Other cases have been studied by Habermann, Bezold, Scheiber, Sporleder, Alexander, and Ruehl.

The Relation of Chronic Progressive Labyrinthine Deafness to Congenital Deafmutism.

I should like to approach a feature which seems to me to be very important—namely, a comparison of the anatomic conditions of the acquired labyrinthine deafness with those of congenital deafmutism. As regards the anatomical conditions of deafmutism, there are the excellent monograph of Siebenmann and a number of individual observations. The characteristic of the group of Siebenmann is a degeneration and metaplasia of the endolymphatic cavity. In a few there is epithelial metaplasia of the basilar membrane. There are, moreover, a hypoplasia of the spiral ganglion and of its peripheric fibres, incomplete development and partial absence of Corti's organ, metaplasia of Claudius's cells and of the basilar membrane. In the second subdivision there are extensive epithelial metaplasia, incomplete development of the sensory epithelium, combined with ectasia, collapsed condition of the membranous labyrinth wall of the inferior part. There are observations by Katz, Oppikofer, Scheibe, Siebenmann, Habermann, Schwabach, Watsuhi, Alexander, and Haike. After a comparison of the condition of the cochlea found by these authors in congenital deafmutism with the conditions found in our acquired progressive

deafness, there is no question but that the same conditions are present. This is especially well marked in the cochlear duct. There are not only diminution but a final atrophy of the entire organ, and a diminution of the individual cells—in other words, a numerical hypoplasia and a hypoplasia of the individual cells. There are other changes to be found in the cochlear duct which occur in both diseases—namely, changes in the rest of the epithelium of the duct, changes in the spiral ligament and in the stria vascularis, and altered position of Reissner's membrane.

The second place in which both diseases present the same anatomic changes is the region of the spiral ganglion and also in the delicate nerve terminations of the cochlea. The feature which differentiates the progressive labyrinth deafness from congenital deafmutism is principally changes in the nerve trunk, which are practically never absent in acquired deafness. The changes in the trunk of the auditory nerve seem always to be missing in acquired deafmutism, and it seems to me that this is the principal difference in the anatomic conditions of these two diseases, and that this anatomic change of the nerve trunk is the cause of the entire change in the labyrinth. We find in the acquired and in the congenital deafmutism two identical anatomic conditions in the labyrinth which only differ from one another in their cause. If we briefly recapitulate the results of comparing these two affections, we find that in both similar changes occur in the cochlear duct, in the spiral ganglion, and in the delicate nerve terminations, but that they differ primarily in that in the acquired deafness the trunk of the nerve is very much involved, while in the congenital deafmutism it is free. Moreover, in acquired deafmutism occasionally there are certain changes in the labyrinth or in the central nervous system which are absent in acquired deafness. In both an exactly similar affection of the membranous labyrinth is present, which is presumably of secondary nature.

Another question presents itself, namely, as to the congenital nature of the anatomic changes. There is no question that the changes of labyrinth deafness acquired in middle and advanced years are acquired and cannot be regarded as congenital mal-developments. Otherwise the individuals would have been unable to hear normally throughout a part of their lives. Moreover, the large number of cases of nerve deafness can hardly be regarded as congenital diseases. The changes found in acquired deafmutism are regarded by some authors as definitely congenital. The conclusions of these authors are, however, not undisputed. We have seen by the examination of a large amount of material that these anatomic changes are unusually frequently acquired. Just on account of its anatomic condition an affection cannot be regarded as congenital, especially without a corresponding clinical history. Whether in the congenital deafmutism the anatomic changes develop intrauterine is a question which it is very difficult to answer. Most of the specimens examined have been obtained from adults or very aged individuals, and in these many years very many changes may occur in the labyrinth.

In conclusion, it seems definitely proven that both affections, congenital and acquired labyrinth deafness, present about the same anatomic changes. In the greater part of the published cases of deafmutism the congenital character of the changes in the membranous labyrinth has not been proven, and the possibility exists that these changes may have occurred later, just as in the case of the acquired progressive labyrinthine deafness.

REPORT OF THE TRANSACTIONS OF THE SECTION ON OTOTOLOGY OF THE NEW YORK ACADEMY OF MEDICINE.

CONJOINED MEETING OF THE SECTIONS ON LARYNGOLOGY
AND OTOTOLOGY, MAY 29, 1907.

THOS. J. HARRIS, M.D., CHAIRMAN SECTION ON LARYNGOLOGY.
WENDELL C. PHILLIPS, M.D., CHAIRMAN SECTION ON OTOTOLOGY.

Papers.

Meningitis in its relation to rhino-otology.

(a) **Meningitis as an intracranial complication in diseases of the nasal accessory sinuses.** By L. A. COFFIN, M.D.

After referring to the paucity of any but the very latest literature on the subject, Dr. Coffin spent considerable time in reviewing the later writings and in reporting cases in order to establish the unquestioned prevalence of cerebral complications of suppuration in the accessory sinuses of the nose. Dr. Coffin asked for systematic and sympathetic co-operation of clinicians and pathologists in the further study of the question.

As to the mortality following operation for the relief of diseases of the various sinuses, especially referring to radical work, Dr. Coffin said that the cases that die should fall into two classes, viz.:

1. Those that die within two or three days exhibiting marked cerebral symptoms, and in whom autopsy disclosed brain lesions that could not have been induced by operation; and
2. Those cases that die in from two to five or more weeks after operation, in which class doubt may properly arise as

to whether the operative interference enters as a causative factor in the production of the cerebral lesion.

None of the latter class was referred to in the paper, and Dr. Coffin reported a mortality rate of less than two per cent. from the combined figures of several men who had done in all 240 radical operations for the relief of sinus disease.

He warned against the undertaking of so difficult, complex, and serious an operation by men not sufficiently educated or prepared for the work.

Dr. Coffin stated his conviction that the sinuses of children were far more frequently diseased than is generally believed, quoting reports of a number of investigations in support of the statement.

During 1906, there were reported in New York City 198 cases of so-called idiopathic meningitis, 75 of which were under one year of age, and 135 under five years. Dr. Coffin thinks that in the diseased sinus we may find the etiological factor in many of these cases.

As to the relative frequency with which the brain becomes infected from the various sinuses, Dr. Coffin feels that the sphenoid is quite in the lead; because:

1. Of its anatomical structure and relations.
2. It is present in an individual on the average seven years previous to the frontal sinus; and
3. Its disease is less easily recognized, and therefore more often overlooked.

Dr. Coffin sanctioned lumbar puncture before operation in cases of accessory-sinus disease showing marked cerebral symptoms.
(*Author's Abstract.*)

(b) **Meningitis as an intracranial complication in diseases of the middle-ear.** By ARNOLD KNAPP, M.D. (Published in full on pages 416-421 of preceding issue of these ARCHIVES.)

Discussion.—Professor KILLIAN, of Freiburg, Germany, directed his remarks mainly to the subject of Dr. Coffin's paper—"The Intracranial Complications in Diseases of the Nasal Accessory Sinuses." In addition to the three cases of death after frontal-sinus operation which Dr. Coffin had mentioned, and in which the complications resulted after

operation, he had observed six other cases where the complications had existed before operation.

CASE 1.—Left chronic frontal sinusitis with acute symptoms, psychical disturbance, altered gait, retarded pulse. The operation showed changes of a chronic and acute nature,—fibrinous exudate on the mucous membrane of the sinus. The posterior bony wall of the sinus was removed, but there were no changes in the dura and therefore no puncture was made. In a few days all cerebral symptoms disappeared and a serous meningitis was diagnosticated.

CASES 2 and 3.—The others were cases of purulent meningitis after radical operation on the frontal and ethmoidal sinuses, where death occurred in two or three days. At autopsy in Case 2 a point of pus was found at the remnant of the middle turbinate which had not been entirely removed. This point was 1 cm distant from the cribriform plate. The pus could be followed to the dura which was purulently inflamed. The third case was one of chronic pan-sinusitis on the left side. At operation the frontal sinus, the anterior and middle ethmoidal cells, were resected. The posterior ethmoidal cells were apparently normal, and the sphenoidal cavity was not opened. He regretted that he had not sufficiently examined the sphenoidal sinus in this case. The patient died on the third day with meningeal symptoms. At autopsy it was found that everything was healing naturally and there was no infection. The sphenoidal sinus was opened and the mucous membrane was found to be chronically diseased and filled with mucus, but a little pus exuded from one point in the posterior angle which was extended to the dura.

The fourth case occurred eight years ago, a successful case of brain abscess after frontal-sinus disease.

Brain abscesses occur very seldom after diseases of the accessory sinuses and most of them die. This was the second recorded case successfully operated upon. Dr. Killian said that he could not at this time explain the whole case, but that he had operated at the latest moment. The patient had unusually typical brain symptoms. The posterior wall of the frontal sinus was not perforated and was removed, and a little pus was found between the bone and the dura. The dura was covered with granulations and perforated at one point. As

he enlarged this opening he came upon the frontal lobe of the brain and found a large area of pus. The patient improved immediately, before leaving the operating table, and recovered in the best condition, without any mental or cerebral difficulties. He died seven years later of carcinoma of the liver. The autopsy was very interesting. On the lower part of the frontal lobe only a small cicatrix was found.

Dr. Killian said that he had seen one acute case and two chronic cases of sinus empyæma with general sepsis. In the first two cases there was a thrombosis of the cavernous sinus, and in all three cases the patient had acute hemorrhagic nephritis. These cases of sepsis following diseases of the accessory sinuses are very rare.

CASE 5.—The sinuses had been diseased for many years. Fever, exophthalmos, and acute hemorrhagic nephritis followed the intranasal operation. A radical operation was performed on both sides, and the patient died two days later.

CASE 6.—Suffered from chronic empyæma and influenza. The eye bulged and there was acute hemorrhagic nephritis. No operation, but antistreptococcic serum was tried,—but the patient died.

CASE 7.—Suffered from acute or subacute pan-sinusitis; high fever and septic symptoms supervened, the patient being in the ninth month of pregnancy; labor was induced, and the woman died in a few days.

As regards osteomyelitis following diseases of the accessory sinuses of the nose, Dr. Killian had observed two cases. The first (Case 8) had chronic purulent sinus disease, and after a fracture in the frontal region osteomyelitis developed. Notwithstanding numerous operations, the entire frontal bone became necrotic and meningitis supervened.

Patient No. 9 had an old chronic pan-sinusitis and could not be saved. Almost the entire frontal bone was resected. The process extended along the base of the skull and caused an abscess in the temporal lobe which perforated into the ventricle and caused death. The periostitis and osteomyelitis developed after operation at the anterior and inner angle of the wound. There was retention of pus below the mucous membrane and skin at the frontal process of the superior maxilla. The osteomyelitis developed gradually.

Dr. Killian said that some years ago he had had occasion to prepare some anatomical specimens, which were of importance for the subject of the evening. He had very nice plates, and had he known that he would be called upon he would have brought them with him. They show the vascular communications between the bone and the neighboring dura and periosteum. A successfully injected specimen showed the veins of the mucous membrane in direct communication with a series of veins that are in the bone. If you have a well prepared specimen of the lamina papyracea and of the thin ethmoidal cells and hold it up before the light you will see very distinctly the network of branching blood-vessels. They in turn are in direct communication with the blood-vessels of the dura mater, or of the periosteal lining of the orbit. They can be seen with a loupe in properly prepared specimens. Some communications are very direct and show a direct path to the dura. In this way the possibility of infection from the mucous membrane of the accessory sinuses to the brain is clearly shown. The bone nowhere forms an absolute partition wall.

There are unquestionably also lymph channels accompanying the blood-vessels. The lymph sheaths about the olfactory branches communicate directly with the arachnoid cavity.

As to the pathology of the production of intracranial processes, the extension of a septic process in the veins is of frequent occurrence. In osteomyelitis the bone itself is involved and the infection extends in the diploë. Of greatest importance in the estimation of the processes is the virulence of the bacteria. A trauma (intracranial operation) or a new infection may increase the virulence and so start a progressive infective process.

He would not refer to the diagnostic side of the question.

Treatment.—When we come to operate on disease of the accessory sinuses, it must be as radical as possible. All the diseased parts must be removed and a large opening made. If you have a case in which you are not sure of your diagnosis and think it might be meningitis or other intracranial complication, and then find by lumbar puncture that the liquid is not clear and contains streptococci, the operation should not be performed. In cases where you find general sepsis

(acute hemorrhagic nephritis) as a complication of accessory-sinus disease, it is not well to operate.

The treatment, especially in complications after accessory-sinus disease, is to operate in time, especially in cases of diseased orbit. Operate as thoroughly as possible,—radically enough, with proper technique. Faults of technique should not occur. We should learn to perform these operations in such a way that errors *cannot* occur. In cases where frontal sinuses are operated upon, infection may come through the antrum. The maxillary-antrum disease should therefore be first eradicated. As a rule, in all cases open the ethmoidal and sphenoidal sinuses. It does no harm, and if they are diseased it is much better.

The most difficult part is estimating the virulence of the bacteria. If we operate when the virulence is high, the danger is very great. We are unable to tell the degree of virulence of the streptococci. Careful study of autopsy cases will help us in this particular. No extensive operation should be performed in acute cases. If it is absolutely necessary, a simple opening should first be made. After an intranasal operation the virulence of the bacteria is increased, therefore no radical operation should be performed until the acute inflammatory symptoms have abated in the nose.

Discussion.

Dr. GRÜENING said that Dr. Knapp was in favor of early and complete operation, and in favor of operating even in the most desperate cases, for good results are often obtained even then. He agreed with Dr. Knapp fully on these points. He had with him a report from Mt. Sinai Hospital, taken from the last book, covering a record of about fifteen months' work, showing 122 cases of mastoid disease operated upon during that time. There were only three cases of meningitis in all these; five cases of abscess of the brain (three of the temporo-sphenoidal lobe, and two of the cerebellum); and fourteen cases of thrombosis of the lateral sinus. There were fifteen deaths. If one remembers that the patients who come to Mt. Sinai Hospital are poor and neglected, and often arrive in a desperate condition, this mortality is really very small. When

the diagnosis has been made, the patient is generally operated upon immediately. If lumbar puncture is required, the puncture is made when the patient is on the table, also the examination of the blood when needed,—so that the lumbar puncture, the blood examination, and the operation are all performed at the same time if necessary.

There were more than three cases of meningitis. Why are only three so reported? Because they were so entered when they came into the hospital. If the condition of the patient is given by the most important symptom, then meningitis is the more dangerous condition, for we can cure brain abscess more often than we can cure a general meningitis. Moreover, these cases of general meningitis are not only meningitis but are accompanied with general infection. In one instance the meningitis was complicated by streptococcæmia, in another with pneumococcæmia; and one has to consider whether the meningitis is secondary to the streptococcæmia or *vice versa*.

Dr. Knapp had not spoken of the ophthalmoscopic finding in meningitis. This is not important, and he did well not to mention it. He had published an account of a case of serous meningitis in which there was an optic neuritis. As regards the prognosis, it is immaterial whether or not that complication is present.

One condition which Dr. Gruening first observed many years ago is very interesting, *i. e.*, mastoid disease complicated with herpes zoster in the course of the trigeminus. He told of a woman who had applied for treatment for otitis media. She had a very bad headache, high fever, and involvement of the second branch of the trigeminal nerve. He saw this case in consultation, and the patient died of meningitis. Later, he saw a second case of the same nature in Mt. Sinai Hospital, though he did not then connect the mastoid disease with the meningitis. This patient also died. Then he had a third case, and recalling these two which had been complicated with herpes, he said to his assistants that this patient would probably die. He thought that he had to deal with a meningitis, and that because the Gasserian ganglion was affected it was possible that the disease had already extended through the petrous portion—that there was probably a petrous bone

with large air-cells, and that probably the process had extended to the apex of the petrous portion, affecting the Gasserian ganglion, and thence had gone over to the dura, resulting in a meningitis. The patient died later of the meningitis, but unfortunately the Gasserian ganglion was not removed for examination. Dr. Gruening said that he had had five cases which presented this picture. In Dr. Macewen's book a fatal case of mastoid disease complicated with herpes is reported. Dr. Gruening said that recently a report appeared from Brieger's clinic in Breslau containing similar observations. He thought that in this case the disease extended forward into the petrous portion, which was probably pneumatic instead of petrous.

Dr. ZABRISKIE said, in connection with the papers read to-night, he had had occasion to look up the records of the Manhattan Eye, Ear, and Throat Hospital in regard to the relative frequency of suppurative meningitis and brain abscess, and that for the past four years he had made autopsies on eleven cases, nine of which were meningitis and two abscess, but that these figures were of little value because they were so low. The question which had interested him most had been the factor which determined a brain abscess or meningitis in these cases of accessory-sinus disease, and also the very interesting anatomical relations in regard to the lymphatics between the upper air passages—*i. e.*, the nasal membrane, the mucous membranes lining the sinuses—in their relation to the dura. The only knowledge we have on the subject is the comparatively recent experimental work which was done by Cuneo and his students, and they have been able to show—how definitely, remains to be seen later—that the only direct lymphatic connection is between the dura and the olfactory bulb. They have shown fairly conclusively that the lymphatics of the dura are quite distinct from the subarachnoid space following the sheaths of the nerves. That there is some lymphatic connection between the accessory sinuses and the dura seems to be beyond doubt, but it still remains to be demonstrated. It is also a very interesting fact that we can have such a large proportion of sinus disease with relatively so few cases of meningitis, unless we consider another factor besides the direct continuity or exposure of the lymphatic or

vascular layers to the infection. That factor, of course, must be the same as that which determines all infective processes.

Another most interesting question is the pathogenesis of brain abscess. Meningitis is, of course, easy enough to understand when we consider the vast lymphatic connections just spoken of, but brain abscess is another matter. Here we have an infective agent which experience has taught us practically always forms in that part of the brain nearest to the suppurating sinus. Of course there is a certain proportion of cases where we have a direct continuity leading from the dura to the pia by means of adhesions, but there is also a certain number of cases in which this adhesion cannot be demonstrated,—at least we have in our laboratory been unable to find it, and we are forced to either admit the almost impossible feat of the infective material passing directly through the cerebro-spinal fluid and lodging in the brain, or else we must search for an abnormal bridge by which the infective material can travel across the subarachnoid space, such as a small vessel. These vessels do occur abnormally, as we have demonstrated in the laboratory, but their relative frequency is yet to be determined.

Dr. MYLES said that it had always been to him a mooted question how and why meningitis occurs. He had had thousands of operative cases of disease of the ethmoids and sphenoids, but had never yet had serious brain complications or brain symptoms directly associated with the operative procedures. He had one case where he was about to operate on the frontal sinus—a man who had been under observation for some years previously, and upon whom he had often urged the necessity for operation. He appeared after a year's absence and consented to have the operation performed if he could be allowed a week's time in which to arrange his affairs. This was allowed, and later, before the time set for the operation, he received word that the man had died of meningitis. He had also had another case in which he had not operated. In an interesting case of grippe, he operated upon an abscess on the inferior turbinal which had extended along the bone of the nose and out on the outside of the antrum. This was cut and the wound drained and packed. The wound healed, although the patient was more or less comatose for several

weeks at that time. The general physician said that it was a meningeal disease, but there was no evidence of pus in the cells and the patient apparently recovered. About a year afterward he died of brain complications.

Dr. Myles claims that the phagocytic wall is the greatest barrier to meningitis in accessory-sinus cases where the brain plates are disintegrating, and when this wall is disturbed it causes lymphatic absorption, or venous thrombosis, or some other means of transmitting the septic conditions to the meningeal cavity. He always showed a great deal of respect for the meningeal membrane that passes down with the olfactory nerve, and attributes his freedom from fatalities to not disturbing that part of the ethmoid. In other words, he cuts off the middle turbinal, and always leaves the median wall of the ethmoid, especially in frontal-sinus complications, as he believes that thrombotic absorption or direct infection is probably the cause of some of the brain complications. In every operation that he has performed in this region he had always feared that death ensue, but so far it has not occurred. He was always fearful of it, however, and always respected that part of the cribriform plate and crista galli region.

Dr. DENCH said that about ten years ago he reported a case of otitic meningitis, in which he drained the subdural space over the tegmen tympani. The patient made a perfect recovery. Although he had operated on a number of cases of meningitis since that time all the others had terminated fatally. In the latter cases, not only had the subdural space been drained, but ventricular drainage had been employed in some cases supplementary to lumbar puncture. Aside from the first cases mentioned, all these cases had proved fatal. It was important to remember that, in these cases, infection usually occurs through the posterior aspect of the petrous pyramid, either through the aquæductus vestibuli or the aquæductus cochleæ, or the infection may travel along the sheath of the auditory nerve. In the successful case mentioned by Dr. Dench, infection had taken place through the roof either of the antrum or tympanum, and had infected the meninges in the middle cranial fossa. From the success reported in decompressive operations for the relief of brain tumor, Dr. Dench was inclined to think a similar plan might be tried,

with success, in cases of otitic meningitis. He was inclined to believe that the pressure would be best relieved by removing a large area of bone over the cerebellar fossa, incising the dura by a crucial incision, and then packing off the subdural space. In this way, the pressure symptoms would be relieved, and, at the same time, the subdural space would be drained. In the presence of any localized area of caries, indicating the route of infection, he was inclined to think that a decompressive operation would be more successful if the subdural space were drained below the tentorium rather than above it. If, however, a carious area was found at the time of the radical or mastoid operation, naturally this should be followed, and the dura exposed at the seat of the infection. Remembering that infections usually occur along the posterior aspect of the pyramid, particular attention should be paid to the condition of the bone in front of the lateral sinus; any carious area found here should be carefully followed. Ventricular drainage might be indicated in certain cases, but, at the present time, he believed that the simple decompressive operation, with incision of the dura and light packing of the subdural space along the incisions, should be the first step of the procedure. Ventricular drainage might be performed later, if necessary.

Dr. COAKLEY said that Dr. Coffin's paper directing attention to meningitis of nasal origin was most interesting. He thought that more cases of meningitis arise from purulent conditions of the nose than have heretofore been credited to that cause. Many children die of meningitis, and if these cases were examined at autopsy the point of infection would often be found to be from the nose or naso-pharynx. Those men who are treating children realize that condition to-day as they did not a few years ago. He wished that Dr. Coffin had been able to arrange his cases so as to determine the proportion of meningitis arising from intranasal operation as against the radical method, but that was probably impossible as yet.

Dr. Coakley himself felt that a rather complete external operation is much to be preferred to the intranasal operation. The latter is much more dangerous, especially in the frontal sinuses. Professor Killian's remarks would apply more particularly to intranasal operations followed by an external operation. That is because there is in many chronic cases a

bacterium whose virulence is slight. He had met this difficulty in some experiments he had conducted this past winter. Streptococci taken from long-standing disease of the accessory cavities could not be made to grow on any ordinary media except blood agar; they could then be transferred to a second medium and would grow well. The intranasal work increases the virulence and quantity of these bacteria, and then if an external operation is performed one is much more liable to get infection. He had always previously considered it advantageous to do considerable intranasal work, and if that did not relieve the patient, to proceed with an external operation. All have had a certain number of septic cases result from the external operation.

Another point upon which Dr. Coffin had touched was that it makes considerable difference who does these operations. Many deaths follow sinus operations that are never reported, and there are good reasons why—the proper care was not observed. If these cases could be added to those reported by Dr. Coffin, the number of fatalities would be greatly increased. In many instances it was not the fault of the operator, but of his assistants. When working in the region of the ethmoid plate any undue force in sponging by the assistant can very easily perforate it. A trained assistant is as necessary as a trained operator.

Another point is the method of operating. In operating by the external route, in removing the ethmoidal-cell labyrinth, if the instruments are not sharp enough the operator is liable to pull on the fibres of the olfactory nerve. Such traumatism is very dangerous. Sharp instruments should be used to cut off these fibres, so as not to endanger infecting the perineural lymph channels extending through the cribriform plate.

Dr. COFFIN, in closing the discussion, thanked the gentlemen who had discussed his paper. With Dr. Coakley, he felt that the more he studied these cases in regard to intranasal work previous to radical operation, the more he was inclined to believe that we ought to do no intranasal work previous to the radical operation. If we adhere to this rule, we will have less trouble.

REPORT OF THE TRANSACTIONS OF THE NEW YORK OTOLOGICAL SOCIETY.

BY DR. T. J. HARRIS, SECRETARY.

MEETING OF MAY 28, 1907. THE PRESIDENT, DR E. B. DENCH,
IN THE CHAIR.

Dr. BRYANT presented a case of **suppurative labyrinthitis**. The patient was a man nineteen years old who had contracted purulent otitis media from bathing. Five weeks ago facial paralysis appeared on the same side. The discharge soon stopped. A week ago violent vomiting with extreme vertigo. At present the facial paralysis is total and there is a slight muco-purulent discharge through a large perforation. The patient cannot jump with the eyes closed or walk more than a few steps without falling to the healthy side. Probably all auditory function and sensibility lost on the affected side. Horizontal nystagmus on both sides, most marked on the healthy side.

Discussion.—Dr. DENCH thought that the facial paralysis, in connection with the discharge from the ear, warranted an exploratory operation.

Dr. HASKIN reported a case of labyrinthitis where one semi-circular canal and part of the cochlea had been removed. In this case there was marked rotary nystagmus.

Dr. GRUENING reported a case of a child who suffered from nystagmus where he had operated without improvement. Later, it was discovered that the nystagmus was congenital.

Dr. ARNOLD KNAPP referred to the view of Neumann, that when nystagmus was found to change from the healthy to the affected side in the course of the disease, it always denoted involvement of the cerebellum.

Dr. HASKIN raised the question of the connection existing between the semicircular canals and the eye. He quoted Quain as stating that the connection was through the cochlear branch.

Dr. ALDERTON presented a case of **disease of the middle ear as a result of fracture of the base of the skull**. The accident occurred in a young man on the fifth of January, 1907. Since then there has been a hissing tinnitus with slight difficulty in hearing. The examination showed nothing abnormal in the auditory canal. The lower tuning-fork limit was C-². Galton's whistle was 2.4 and 1.7—no gaps. Bone conduction was better than aerial conduction. The incus appeared to be displaced backward. Watch, two feet in one ear and one inch in the other; a kidney-shaped cicatrix occupied the lower half of the drum membrane.

Dr. DENCH reported a case of **mastoidectomy in a man of seventy years** who consulted him for difficulty in hearing which had developed after an attack of grip a few months before. Examination showed a sinking of the upper and posterior walls of the canal and a slight tenderness and bog-giness over the mastoid. Pus was found in the mastoid cells; the culture from the mastoid pus showed streptococcus capsulatus. The patient made a good recovery.

Discussion.—Dr. ALDERTON said that he had seen two similar cases. The first was a man aged sixty-nine with a history of deafness of three weeks. Wax was removed from one ear with good result. The drum membrane in the other ear was dull in appearance. There was a suspicious swelling posterior to the mastoid tip. Four days later, operation; thick pus was found in the antrum and the sinus was covered with granulations. In this case there was no temperature and no sinking of the canal wall. There was rapid recovery. The second patient was a woman of seventy years. Here, also, there was no temperature and only a slight sinking of the canal wall. Her only complaint was neuralgia on the affected side. An operation showed that the sinus and cerebellum were exposed. Recovery.

Dr. DUEL reported a case of an old man whom he had seen in consultation suffering from pain in the mastoid region and below in the neck which had existed for six weeks. The

drum membrane was normal in appearance. On pressure over the tip of the mastoid there was pain. The operation showed a Bezold perforation. Pus and granulations were found throughout the cells and a perisinus abscess was present.

Dr. ALDERTON stated upon inquiry that he could not elicit any history of middle-ear suppuration in either of his cases.

Dr. ADAMS reported the case of a man complaining slightly of difficulty in the hearing, whose drum he incised, allowing a non-purulent fluid to escape. No evidences of mastoiditis were found.

Pathologist reported the *streptococcus of Friedlander*. The operation revealed complete destruction of the entire mastoid cells.

Dr. DENCH stated that in eleven cases of mastoiditis showing the *streptococcus capsulatus*, only four came to operation, showing that the serious prognosis made by pathologists in such cases is not altogether justified. He regarded very slight mastoid tenderness as somewhat characteristic of the presence of this bacillus.

Dr. GRUENING did not think that we should operate as the result of a bacteriological examination alone.

Dr. McKERNON had seen three cases, all adults, where the *streptococcus capsulatus* was present. All had been operated upon and two had died. All did poorly. The mastoid in each case was completely destroyed.

Dr. GRUENING thought that the prognosis in each case depended upon the stage of the disease when the operation took place.

Dr. ALDERTON reported a case of **mastoiditis complicated by sinus thrombosis and meningitis**. There was a history of grip some time previous. Ten days later, on account of the unhealthy condition of the bone and the delayed healing, he performed a second operation which revealed a perisinus abscess. At a third operation the jugular was ligated as well as a second jugular behind the artery which was also infected. Pus was seen coming out from the sinus and its external wall was removed. Up to this time there was no temperature and the tongue was clean. There were no chills, only increasing weakness. The symptoms of meningitis became pronounced and patient died.

Dr. McKERNON said that he regarded a discoloration of the bone around the sinus as a valuable sign in sinus thrombosis.

Dr. GRUENING had seen one or more cases of double jugular vein during the past winter.

Dr. LEWIS reported a case, seen twenty-four hours previous, of **doubtful mastoiditis**. The patient was a girl aged seventeen, who gave a history, beginning ten days previous to his seeing her, of pain in the ear, followed within twenty-four hours (so the patient stated) by discharge which lasted for a few days.

On examination the membrana tympani was seen to be normal, and on testing the hearing it was found to be normal. The patient complained of mastoid tenderness. While the Doctor was pressing on the mastoid and employing very slight pressure the patient had a convulsion, with apparent loss of consciousness for fifteen to twenty seconds. No previous history of convulsions. The patient remained limp for an hour afterward.

He had regarded the case as a neurotic one, but he now questions, in view of the above histories and reports, if it were not a case of obscure mastoiditis.

Dr. BRYANT reported a case of **mastoiditis complicated by venous thrombosis and meningitis**, followed by death, in a woman twenty-three years old. After the operation the temperature arose to 104.8° , and then fluctuated between 99° and 101° to the fourth day, when it arose to 105.6° . A pure streptococcic culture was obtained from the blood and anti-streptococcic serum injected. On the sixth day the temperature had arisen to 107.4° and a clot was removed from the sigmoid sinus, the internal jugular vein tied and removed. On the ninth day, there was another injection of anti-streptococcic serum. The patient died on the eleventh day; temperature 107.4° . The wound showed no signs of healthy granulation at any time, but was kept fairly clean with the use of horse serum. The opsonic index varied only very slightly, starting at $\frac{8.8}{100}$ and closing at 1. The leucocytosis ranged from 12,000 to 26,000 and back to 16,000, and the polynuclear from 80% to 89% and 85%.

Dr. GRUENING referred to a case where the temperature had arisen to 107.8° . Here the jugular had been tied and the sinus removed. A second operation showed the lower stump

of the vein necrotic. This he tied off behind the clavicle. The patient recovered.

Dr. DUEL dwelt on the fact that the otologist was not keeping abreast of the pathologist, especially in the significance to be attached to smears and cultures from the ear. He quoted as evidence the recent work of two English pathologists showing more than thirty classes of streptococci, classified from something like two hundred varieties, according to their growth and ten different culture media; organisms appearing the same in smears were shown to vary greatly in virulence.

Dr. LEWIS mentioned a case of operation for double mastoiditis, which he had reported some years ago, where a temperature varying between 99° F. and 106° F. persisted for thirteen days, each rise of temperature preceded by a chill. Sinus thrombosis was diagnosed, and operation was advised, but refused. The patient recovered.

Dr. SHEPPARD stated that he had seen daily ranges of a temperature of from 97° to 107.2° in two cases of sinus thrombosis.

Dr. ARNOLD KNAPP asked the proper treatment for keloid occurring after mastoid operation.

Dr. GRUENING in one case had cut out a keloid to have it followed by another.

Dr. HASKIN referred to a recent paper where a report of eleven cases was made in which the X-ray had been used for keloid with success.

Dr. MCKERNON had used the X-ray in one case with marked reduction of the keloid. Thirty treatments were given, beginning a year after the operation. In his experience post-operative keloid was rare.

Dr. MCKERNON reported an operation for **mastoiditis complicated by thrombosis of the lateral sinus and the jugular vein**, resulting in death. The patient was a child of five and one half years who had suffered from follicular tonsillitis followed by acute suppuration of one ear. Under proper treatment this condition cleared up. One month later, it recurred with temperature of 102°, polynuclear count 96%. The smear from the ear showed the *diplococcus intercellularis meningitidis*. The operation revealed an epidural and perisinus abscess. During the operation on the bone, gas

escaped from the bone cells. The temperature gradually arose after the operation. At the second operation the vein was removed one inch below the clavicle. The sinus showed a clot and pus. Death resulted in two days. He regarded gas escaping from the bone as a bad sign, especially in connection with the presence of the diplococcus intercellularis meningitidis.

Dr. ALDERTON stated that he had seen two cases where gas had escaped from the middle ear. Both of the cases came to operation and recovered.

Dr. DUEL had seen several cases in children where gas had escaped on incision of the drum membrane. None came to the mastoid operation.

Dr. GRUENING thought that it was in cases of gas escaping in old perforated drums that the mastoid was involved.

Dr. LUTZ asked advice in regard to a patient with **mastoiditis, having also Bright's disease**; albumen about 10%; pulse poor, skipping a beat in every four; and a large goitre. The patient is much opposed to operation, and Dr. Lutz wanted to know whether he was justified in urging an operation under the existing conditions when the patient seemed to be doing well.

Dr. ALDERTON did not think that albumen in the urine in mastoiditis was necessarily of significance; it sometimes disappeared during convalescence. He had operated successfully in such cases with cocaine anæsthesia.

Dr. RAY was inclined to think that chloroform was sufficient in such cases.

REPORT ON THE PROGRESS IN OTOTOLOGY DURING THE FOURTH QUARTER OF THE YEAR 1906.

BY PROF. ARTHUR HARTMANN, BERLIN.

Translated by Dr. ARNOLD KNAPP.

ANATOMY AND PHYSIOLOGY.

359. KISHI. Anatomy of the ear of the Japanese. I.—The glands of the external auditory canal. *Arch. f. Ohrenhkl.*, vol. lxx., pp. 205-210.
360. STEINITZ. Contribution on the anatomy of the stapedius muscle. *Arch. f. Ohrenhkl.*, vol. lxx., pp. 45-50.
361. LEWIN, L. I.—The occurrence of persistent stapedial artery in man and the comparative anatomy and phylogenetic significance of this phenomenon. II.—Peculiar excrescences on the drum membrane and formation of follicles in the tympanic mucous membrane. *Arch. f. Ohrenhkl.*, vol. lxx., pp. 28-44.
362. BALDENWECK, L. Anatomic examination of the apex of the petrous portion. *Annales des mal. de l'or*, etc., February, 1907.
363. WUNSCH, MAX. Congenital habitual dislocation of the left maxillary joint occurring with rudimentary development of the left external ear. *Deutsche med. Wochenschr.*, No. 13, 1907.
364. KUBO, INO. About the normal condition of the lower turbinals in man. *Arch. f. Laryng.*, vol. xix., No. 2.
365. KUBO, INO. Contribution on the histology of the lower turbinals. *Arch. f. Laryng.*, vol. xix., No. 1.
366. KALISCHER, OTTO. On the function of the temporal lobes of the cerebrum. A new method of training the hearing in dogs. A contribution to training as a psychological method of examination. *Trans. of the Prussian Royal Acad. of Science*, February 21, 1907.
367. KÖRNER, O. Can fish hear? A contribution to otology. *Festschrift Prof. Dr. August Lucae*.

359. KISHI. Anatomy of the ear of the Japanese. I.—The glands of the external auditory canal.

The author believes that he has discovered differences

between the ceruminous glands of the Japanese and Europeans. He thinks that the cerumen is not the product of ceruminous glands, but of sebaceous glands. ZARNIKO.

360. STEINITZ. *Contribution on the anatomy of the stapedius muscle.*

Exact microscopic details of the relation of the muscle fibres to the connective tissue in the stapedius muscle in man, cats, guinea-pigs, and rats; on the termination of the motor and sensory nerves of the muscle. ZARNIKO.

361. LEWIN. I.—*The occurrence of persistent stapedia artery in man and the comparative anatomy and phylogenetic significance of this phenomenon.*

II.—*Peculiar excrescences on the drum membrane and formation of follicles in the tympanic mucous membrane.*

The author examined the temporal bones of a child aged nine months, which died of diphtheria, and found on the right side a persistent stapedia artery. This vessel is one which represents a persistent structure of many mammalia; in others and in man it disappears in early life. The same temporal bone presented on the anterior third of the inner surface of the drum membrane a large number of peculiar excrescences, consisting of a circumscribed collection of lymphocytes containing a capillary vessel and covered on the surface by a continuation of the tympanic epithelium. The author believes this to be a remnant of embryonal connective tissue. ZARNIKO.

362. BALDENWECK. *Anatomic examination of the apex of the petrous portion.*

These investigations were undertaken for the purpose of explaining the relationship of the abducens nerve to the apex of the petrous portion and to the middle ear, with a view to understanding the cause of paralysis of the abducens nerve as it occurs in the course of acute otitis. The abducens nerve, after perforating the dura at the posterior surface of the pyramid, passes between the dura and the petrous apex in a bony sulcus at the outer side of the inferior petrosal sinus, anterior to the cavernous sinus. During this part of its course it is directly contiguous to the petrous pyramid for a distance of 1 cm. The petrous pyramid is sometimes compact,

sometimes spongy, and occasionally pneumatic. The pneumatic cells may communicate at the anterior, posterior, or inferior surface of the pyramid with the middle-ear cavities, either with the apex cells, the floor cells of the tympanum, or with the mastoid cells. It is thus that in disease of the middle ear the path to the abducens nerve may under certain conditions be preformed. BOENNINGHAUS.

363. WUNSCH. *Congenital habitual dislocation of the left maxillary joint occurring with rudimentary development of the left external ear.*

Short report of a child two weeks old which lacked the external ear with the exception of the rudiment of the lobule. There was also absence of an opening to the external auditory meatus. The balance is set forth in the title. NOLTENIUS.

364. KUBO. *About the normal condition of the lower turbinals in man.*

The turbinals of new-born children were examined. The limiting membrane had not fully developed. The glands were well formed, more marked on the internal than on the external side. They are more superficial than in the adult. The adenoid layer is absent, which has never been observed in the adult. The medullary cavities in the bone are also absent.

VON EICKEN.

365. KUBO. *Contribution on the histology of the lower turbinals.*

The specimen examined was previously injected, and shows well the arrangement of the blood-vessels in the cavernous body, and its elastic fibres. The article is excellently illustrated.

VON EICKEN.

366. KALISCHER. *On the function of the temporal lobes of the cerebrum. A new method of training the hearing in dogs. A contribution to training as a psychological method of examination.*

Kalischer trained dogs so that they grasped pieces of meat that were held out to them only on hearing certain tones; on all other tones the pieces of meat were not allowed to be seized. The animals were so well trained that they distinguished

between the sounds at which they were permitted to eat and the associated half-tones. After extirpating both temporal lobes the reaction to the sounds for eating remained, but other disturbances of hearing were present when the ordinary functional examination was made. Prompt reaction to commands was lost after extirpating the cortex of the temporal lobe. After removing the corpora quadrigemina the animals did not forget any of their training.

"My experiments showed that hearing reactions may result not only from the cerebral cortex, but from intracortical centres under certain conditions, even those reactions such as the perception of differences of tone in training, which we have formerly regarded to be a function of the cerebral cortex."

HARTMANN.

367. KÖRNER. *Can fish hear?*

After a critical review of the work of other authors, Körner, having experimented with a child's mechanical toy which produces a short, harsh sound, "kri, kri," comes to the following conclusion: It seems that many varieties of fish react to vibrations of sound which are repeated in rapid succession in water or transmitted through the water (experiments with tuning-forks and electrically driven bells). It has not been proven that fish perceive these continuous sound vibrations by the so-called hearing organ. The reactions described seem in many cases to have been the result of sensory or visual impressions.

A single loud noise produced under water, of varying intensity and pitch, failed to produce any reaction in twenty-five varieties of fish. As the function of the other senses of the fish, such as vision and feeling, can be easily demonstrated, it seems almost certain that if they possess hearing it could be easily shown. The fish are among all vertebrates the only ones that do not possess a nerve terminal organ similar to Corti's organ, and they are the only animals in which there seems to be no sense of hearing. It seems, therefore, justifiable to say that only those animals can hear which present nerve end-organs in the cochlea. That a part of the vestibular apparatus can react to these impressions is at present an unproven hypothesis.

SUCKSTORFF.

GENERAL.

a.—REPORTS.

368. SCHMIEGELOW E. Contributions from the Oto-laryngological Department of St. Joseph's Hospital, 1905. Copenhagen, 1906.

369. ZEMANN. Report of the Ear Department of the Military Hospital in Vienna during the years 1903, 1904, and 1905. *Arch. f. Ohrenhkl.*, vol. lxx., pp. 169-186.

370. LASER. On the presence of deafness and its causes in school children. *Deutsche med. Wochenschr.*, No. 5, 1907.

371. SCHWARTZE. Improper terms in our literature. *Arch. f. Ohrenhkl.*, vol. lxx., pp. 100-109.

372. KILLIAN, G. The foundation of modern rhino-laryngology. *Berlin. klin. Wochenschr.*, 1906, No. 47.

373. KUBO. The history of old rhinology. *Arch. f. Laryngol.*, vol. xix., No. 1.

368. SCHMIEGELOW. *Contributions from the Oto-laryngological Department of St. Joseph's Hospital, 1905.*

During the year 1905, 331 patients were discharged and 14 died. There were 26 simple mastoid operations and 60 radical operations, also 37 operations for accessory nasal sinus disease. Among the fatal cases, the cause of death in 4 was disease which had no connection with the ear, and in 4 others, consumption. Of the 6 cases which remained, one was a carcinoma of the superior maxilla, one a carcinoma of the nose and orbit, one a sarcoma of the pharynx, 2 cases of otitic meningitis, and one of abscess of the brain. The latter case was that of a man forty-one years of age who had suffered from a discharge from his right ear since childhood, though he had had no treatment for the condition since his eighteenth year. Nine days before admission there were severe pain and vomiting, later stupor. A radical operation was performed. The skull was opened and the brain punctured in various directions but without any result. The autopsy revealed a large abscess in the anterior part of the right frontal lobe.

MÖLLER.

369. ZEMANN. *Report of the Ear Department of the Military Hospital in Vienna during the years 1903, 1904, and 1905.*

In this report the bacteriological examination of 18 cases of mastoiditis is given. The characteristics of the empyema due to streptococci are emphasized, also one which was due

to *B. coli*. Remarks on the after-treatment of mastoid operations. Autopsy report of one case of meningitis.

ZARNIKO.

370. LASER. *On the presence of deafness and its causes in school children.*

A short table of results of examination of 1753 school children, aged from seven to fourteen years. The functional examination of the ear was undertaken with the acoumeter of Politzer. There were 315 cases of deafness. NOLTENIUS.

371. SCHWARTZ. *Improper terms in our literature.*

The author objects to the following three terms: "radical operation," "Bezold's mastoiditis," and "Hartmann's tympanic cannula."

ZARNIKO.

372. KILLIAN. *The foundation of modern rhino-laryngology.*

The important contents of this excellent little paper cannot be given in a short review. The reading of the original is recommended.

RAU.

373. KUBO. *The history of old rhinology.*

Report on the anatomical and physiological knowledge, picture of diseases, pathology, etiology, and methods of treatment of the nose as they appear in old Japanese writings.

VON EICKEN.

b.—GENERAL PATHOLOGY AND SYMPTOMATOLOGY.

374. SIEBENMANN. *On the function and the microscopic anatomy of the ear, with total aplasia of the thyroid gland.* *Arch. f. Ohrenhkl.*, vol. lxx., pp. 83-89.

375. SENDZIAK. *Nasal, pharyngeal, laryngeal, and aural disturbances in circulatory diseases.* *M. f. Ohrenhkl.*, 1906, No. 12.

376. GAWRILOW, T. *Diseases of the ear, nose, pharynx, and nasopharynx in malarial fever.* *Russische Monatsschr. f. Ohrenhkl.*, etc., October-November, 1906.

377. KISHI. *On otitic dyspepsia of sucklings.* *Arch. f. Ohrenhkl.*, vol. lxx., pp. 1-6.

378. LEVY, MAX. *The mortality of ear disease and its importance as to life insurance.* *Deutsche med. Wochenschr.*, No. 13, 1907.

379. CLAIRMONT, P. *On the condition of the saliva with reference to bacteria.* *Wiener klin. Wochenschr.*, No. 47, 1906.

380. HECHINGER, J. *Noma of the ear.* *Arch. f. Ohrenhkl.*, vol. lxx., pp. 7-14.

381. FREY and FUCHS. Reflex epilepsy of nasal, aural, and pharyngeal origin. *Arch. internat. d'otol.*, etc., vol. xxii., No. 2, 1906.
382. ROYET. New observations on vertigo and tinnitus from salpin-go-pharyngeal adhesions. *Arch. internat. d'otol.*, etc., vol. xxii., No. 2, 1906.
383. MIODOWSKI, F. On the pathology of endothelioma of the temporal bone. *Arch. f. Ohrenhkk.*, vol. lxix., pp. 288-296.
384. BARTH. On incorrect musical hearing (diplacusis). *Deutsche med. Wochenschr.*, No. 10, 1907.
385. SOLLEY JNO. S. Paralysis of the facial nerve due to the Eustachian electro-bougie. Report of a case. *Am. Journ. Med. Sciences*, November, 1906.
386. BRYANT, W. SOHIER. Aural affections in relation to mental disturbances. *N. Y. Med. Journ.*, March 23, 1907.
387. FLEXNER, SIMON. Experimental cerebro-spinal meningitis in monkeys. *Jour. Experimental Med.*, March, 1907.
388. GORDON, ALFRED. Purulent meningitis (not epidemic) with meningococcus intracellularis. *American Med.*, February, 1907.
389. McKERNON, JAS. F. The clinical value of the differential blood-count in operative otology. *N. Y. Med. Jour.*, January 19, 1907.
390. DENCH, EDWARD B. Two cases of extensive cholesterin infection of the mastoid cells. *Laryngoscope*, March, 1907.
391. SOUTHARD, E. E. and STRATTON, R. R. A study of acute leptomeningitis (*streptococcus pyogenes*). *Jour. American Med. Assn.*, Oct. 20, 1906.
392. MILLS, H. B., and WARD, N. G. Influenza complicated by mastoid abscess and leptomeningitis. *Medical Record*, March 9, 1907.
393. RAVOGLI, A. Lupus vulgaris of the ear in relation to its late results. *Jour. American Med. Assn.*, January 5, 1907.

374. SIEBENMANN. *On the function and the microscopic anatomy of the ear, with total aplasia of the thyroid gland.*

Many patients with enormous goitre enjoy normal hearing. Even when the thyroid gland degenerates, the hearing may remain normal. Of great clinical importance in the question of "dystheric deafness" (Bloch) has been the microscopic examination of the labyrinth in individuals with complete absence of thyroid tissue. The author describes the conditions found in a labyrinth of this kind. It was obtained from a child four and a half months old suffering from myxœdema, which had died from cachexia in the Children's Hospital in Basel. The microscopic examination revealed an acute catarrhal otitis media, normal form and relation of the labyrinth and its contents; absence of all changes which might cause a distinct

functional disturbance of the ear. There were changes in the labyrinth capsule like those found in the bones of athyroid individuals. This condition induces the author to request that the Commission on Myxoedema should study the frequency of deafness in myxoedema. He is also in favor of abandoning the term "dystheric deafness" because the deafness in affections of the thyroid gland is not dependent upon this but upon other causes.

ZARNIKO.

375. SENDZIAK. *Nasal, pharyngeal, laryngeal, and aural disturbances in circulatory diseases.*

This is a brief recapitulation of the diseases occurring in the respiratory passages and in the ear in circulatory disturbances, together with the most important symptoms.

WITTMACK.

376. GAWRILOW, T. *Diseases of the ear, nose, pharynx, and naso-pharynx in malarial fever.*

The author's native city presents many cases of malaria and with great variety of its form. Various disturbances in the ear, nose, and throat are frequently observed and are supposed to be of malarial origin. The malarial affection of the ear is most frequently present in the form of otalgia and painfulness of the auricle on pressure. The drum is often somewhat reddened; frequently, however, entirely normal. Diseases of the auditory nerve are relatively infrequent. The author has seen only two cases of an irritated condition of this nerve and a few cases where the function was impaired.

Regarding the nose there are most frequently neuralgias of the branches of the first end of the second divisions of the fifth nerve and very severe epistaxis. In the throat, malaria occasions the so-called granular pharyngitis and lateral pharyngitis. In the former the patients complain of the sensation of a foreign body and a scratching in the throat; the second produces disturbances in swallowing, sometimes with pain radiating into the corresponding ear, and dry cough which sometimes occurs in the form of attacks. In all these forms of malaria, treatment with quinine and arsenic rapidly causes these symptoms to disappear.

SACHER.

377. KISHI. *On otitic dyspepsia of sucklings.* *

The author has observed a great many cases of otitic dyspepsia and believes that "the otitic dyspepsia is a not infrequent disease." Important symptoms are enlargement of the liver and grinding of the teeth. "As long as the drum remains intact during the otitis media the enlargement of the liver does not decrease and its consistency remains very hard. The child grinds its teeth as long as pus collects in the tympanum. These two symptoms are peculiar to otitic dyspepsia and always show that it is a case of otitis media of nurslings. In otitic dyspepsia severe inflammatory disturbance never appears in the drum, but only marked cloudiness and bulging."

According to the author's opinion "otitic dyspepsia is produced by the passage of products originating in the tympanum into the digestive tract by way of the Eustachian tube."

The author is evidently not familiar with Preysing's fundamental monograph, otherwise he would have restricted his remarkable assertions. ZARNIKO.

378. LEVY, MAX. *The mortality of ear disease and its importance as to life insurance.*

Believing that all who suffer from chronic purulent otitis are not unsuited for life insurance, Levy has written to all of the German life-insurance companies and received answers from 37. Twenty of these refused any one suffering from chronic otorrhœa; 16 decided according to the individual case after examination by an aurist; one company refuses to make payment if death ensues in consequence of aural suppuration. Aurists also have different opinions on this question; some, especially in former times, are decidedly opposed, while others are more moderate in their views. From the statistics of an important company it can be seen that only 58 out of 46,480 deaths, in other words 0.12%, depended upon middle-ear suppuration. The statistics of the autopsies performed in the Charité Hospital give a somewhat higher figure (0.6%). Other statistics show that the greatest mortality from chronic otitis occurs in the second decade, then rapidly diminishes until the fourth, when acute otorrhœa preponderates.

The author concludes as follows:

1. The negative standpoint of German insurance companies as regards accepting risks from those suffering with chronic purulent otitis is not justified.
2. If the aural suppuration appears clinically benign, the acceptance with increased premiums, should follow.
3. The decision can only be made by an aurist.

NOLTENIUS.

379. CLAIRMONT, P. *On the condition of the saliva with reference to bacteria.*

The author after examining the literature finds that only two facts can be regarded as definitely proven, viz.: The attenuation of the virulence of the pneumococcus in saliva or on culture-media containing saliva, notwithstanding abundant growth; and the attenuation or destruction of toxins by digestive ferments. A number of experiments were made with the secretion of the parotid and submaxillary glands obtained from dogs, cats, rabbits, goats, and monkeys; these gave the following results: When wounds in the mouth heal primarily, this depends upon two conditions, *i. e.*, the poor condition for the existence of bacteria and the mechanical removal by saliva. The bactericidal action of the saliva is of no account; at the same time, a small number of organisms find such unfavorable conditions of life in saliva that they die. Human saliva in this regard is inferior to that of certain animals.

There are differences between the saliva from the submaxillary and from the parotid glands. While the former develops no, or only slight, action against bacteria, the parotid secretion of various animals and of man is capable of showing a distinct retarding action on the growth of micro-organisms. Under the unfavorable conditions of existence the staphylococcus and streptococcus seem especially likely to suffer. If broth is added to the saliva the conditions for existence are improved. If the salivary secretion is artificially stimulated in animals or in man, in a short time the saliva becomes sterile.

The author's experiments have shown that we may regard the mouth to a certain extent as a protection for the body. This action is supplemented if the salivary secretion is

stimulated and retention of favorable culture media for bacteria is prevented.

WANNER.

380. HECHINGER, J. *Noma of the ear.*

A complete case-history with autopsy report and histological examination. In this case the necrotic tissue was infiltrated with many streptothrix threads, which the author, with Perthes, regards as the cause of noma. This case differs from those reported by Bezold in that the middle ear was also invaded.

ZARNIKO.

381. FREY and FUCHS. *Reflex epilepsy of nasal, aural, and pharyngeal origin.*

This has been reported in the *Transactions* of the Otological Section of the International Medical Congress in Lisbon, April, 1906.

OPPIKOFEK.

382. ROYET. *New observations on vertigo and tinnitus from salpingo-pharyngeal adhesions.*

Vertigo and tinnitus are frequently caused by thick ridges which pass from the posterior lip of the Eustachian tube to the posterior pharyngeal wall. The breaking up of these adhesions by means of the finger passed into the retranasal space causes the vertigo and tinnitus to disappear. To show the value of this treatment, 5 case histories are given, which are not, however, conclusive. According to the reviewer, these cases were those of hysteric and neurasthenic patients who were influenced by this peculiar and unusual form of treatment. The author has previously expressed the opinion that these folds starting from the tubal openings are frequently the cause of middle-ear sclerosis. The reviewer has searched in vain for this fold formation in 22 cases of stapes-ankylosis, and if we remember the histological picture of this disease it seems hardly credible that the solution of these adhesions can produce an improvement or even a cure.

OPPIKOFEK.

383. MIODOWSKI, F. *On the pathology of endothelioma of the temporal bone.*

A man, fifty-five years of age, poorly nourished, came for treatment on account of a complete left-sided facial paralysis and a tumor situated behind the ear which resembled in

appearance a Bezold's mastoiditis. The patient has never suffered from discharge or pain in the ear. At operation a new growth was found which completely occupied the tip of the mastoid process and was adherent to the wall of the sinus and to the cerebellar dura. Anteriorly the tumor extends to the descending branch of the inferior maxillary. Notwithstanding the operation the tumor extended into the auditory canal and finally into the interior of the skull. Death followed 21 days after operation.

Histologically the tumor proved to be a typical endothelioma. The only other cases reported are those of Leutert and Nadoleczny. The diagnosis is difficult and points of importance in differential diagnosis are given (absence of otorrhœa, facial paralysis, cachexia). ZARNIKO.

384. BARTH. *On incorrect musical hearing (diplacusis).*

Barth is still of the opinion that the so-called diplacusis depends upon illusion, as the patient with his diseased ear perceives the tone with a changed clang-tint and is, therefore, induced to regard the tone as higher or lower. For the certain proof of diplacusis Barth demands that each ear should be examined with certain exclusion of the other and the patient be requested to sing what he hears under varying conditions. The author has been able to confirm his opinion in two cases of disease of the internal ear, so that he concludes that he first must see a case of true disharmonic diplacusis before he believes in this condition. NOLTENIUS.

385. SOLLEY, JNO. S. *Paralysis of the facial nerve due to the Eustachian electro-bougie. Report of a case.*

The smallest electro-bougie was passed into the left Eustachian tube with one milliamp. of current. A constriction was met with about one and a half inches from the mouth of the tube. After firm pressure for about four minutes with the current increased to 1.5 milliamp. the bougie suddenly advanced one eighth of an inch and met a still firmer resistance, accompanied by sharp pain. On withdrawing the bougie slightly the entire left side of the face was seen to be relaxed. During the eleven months which have elapsed since the injury, the hearing has increased for whispered voice from less than one foot to over twenty-five feet. The only evidence

of paralysis remaining is purely subjective. The Eustachian tube was bougied but three times. CLEMENS.

386. BRYANT, W. SOHIER. *Aural affections in relation to mental disturbances.*

The results reached by the writer's experience in the examination of the ears of the insane show that ear disease is much more prevalent among the insane than among the sane. In fact it is the exception not to have some demonstrable functional disturbance of the ear. The author found it present in 90% of the cases examined. In many of these cases a history can be obtained which shows that the ear disease was in existence before the insanity appeared, and in others the condition of the ears is such that it must have antedated the mental disturbance. CLEMENS.

387. FLEXNER, SIMON. *Experimental cerebro-spinal meningitis in monkeys.*

By means of the experiments here recorded it has been shown that the lower monkeys can be infected without great difficulty with the diplococcus intracellularis and made to reproduce the pathological conditions present in man in cerebro-spinal meningitis. In the monkeys the inflammation extends into the membranes covering the olfactory bulbs, ethmoid plates, and nasal mucosa. This olfactory inflammation is important because it shows that the localization of the exudate at the base of the brain is not necessarily produced by the infection arising from the nasal mucosa as has been assumed in human infection. The quantity injected into the canal in these experiments varied from two loops of a fresh culture to several cultures. The actual multiplication of the diplococci, except possibly in an abscess, is very small, in some cases none at all—a marked contrast to what occurs in man. Intravenous injections of enormous quantities of the diplococci produce practically no symptoms, except local swelling and tenderness. CLEMENS.

388. GORDON, ALFRED. *Purulent meningitis (not epidemic) with meningococcus intracellularis.*

Although the meningococcus has been found in 80% of the cases of epidemic cerebro-spinal meningitis, its absolute

specificity cannot be settled. The case here reported revealed no possible local infection and no characteristic symptoms of epidemic meningitis, and yet the meningococcus was found in the cerebro-spinal fluid. The autopsy revealed a cloudy pia and purulent deposit over the sulci of the entire brain which was more marked over the upper and lower surfaces of the cerebellum. The case was an alcoholic. CLEMENS.

389. MCKERNON, JAS. F. *The clinical value of the differential blood count in operative otology.*

The differential blood count is of value in aiding a complete diagnosis, and when the symptoms are distinct and definite it is then only confirmatory of what is already present. In doubtful cases when the count is negative, daily counts should be taken to verify or disprove that which has formerly been taken. It has also been found that when cellular bone structures, like the mastoid bone, are involved in septic inflammation without involvement of the adjacent blood currents, the differential count shows a relatively lower polynuclear percentage than when a septic process is present in the soft tissues. This fact is explained on the theory that absorption of toxins is less rapid in bone cavities.

CLEMENS.

390. DENCH, EDWARD B. *Two cases of extensive cholesterin infection of the mastoid cells.*

In these two cases the true cholesteatomatous collection was insignificant in size, but in each instance all of the mastoid cells were infiltrated with cholesterin.

CLEMENS.

391. SOUTHARD, E. E. and STRATTON, R. R. *A study of acute leptomeningitis (streptococcus pyogenes).*

This report is based on a series of cases of leptomeningitis from streptococcus infection. The lesions reported differ in no constant feature from those given by Southard and Keene in 1905 for the pneumococcus. The effects of the two organisms on tissues would apparently place them in the same group. The durations of the streptococcus cases were rather greater than in the pneumococcus ones. The vascular lesions may serve to distinguish the pneumococcus-streptococcus cases from meningococcus cases but it would be less easy to

distinguish them from those in tuberculous cases. It is rare to find in streptococcal as in other forms of leptomeningitis, any single lesion which is necessarily incurable. It is probable that in many cases the patients die of a toxæmia, which may vary with the extent of the exudate. Lung lesions appear to have been overestimated in producing meningitis. The streptococcus cases seem to be more cerebral or meningitic from the very start of acute symptoms, than are the pneumococcus and staphylococcus cases.

The clinical summary shows that seven patients were male, two female. Seven were over thirty years of age; two of these were over fifty. One was nineteen, one an infant. Five cases showed otitis media.

CLEMENS.

392. MILLS, H. B. and WARD, N. G. *Influenza complicated by mastoid abscess and leptomeningitis.*

The report of this case contains the following points of especial interest: An attack of influenza was followed by mastoid abscess, suppuration and necrosis of the posterior ethmoid cells. The usual operations were performed for the relief of these conditions with some temporary improvement except the extreme headache. Suddenly violent pain in the head occurred which was followed by unconsciousness for the period of nine days, associated with restlessness, high remittent temperature, and finally death. An autopsy revealed a leptomeningitis with pus in the ventricles; the lateral ventricles in particular were widely distended with thick greenish pus. There was no bacteriological examination of the pus made at any time.

CLEMENS.

393. RAVOGLI, A. *Lupus vulgaris of the ear in relation to its late results.*

Two cases of lupus are here reported and in both the tubercle bacillus was found in the extensive ulcerations. In one case the disease had involved the osseous structure and other tissues as well. The author states that the connective tissues, bones, and fascia do not resist the invasion of the tubercle bacillus as successfully as the skin, and consequently it is not as easily controlled when present in these tissues. The treatment was not encouraging. The application of Finsen light with Lortet and Genou apparatus in the first case was of no

benefit; in the second it proved at first beneficial. The results obtained by using the X-ray were but transient. The application of pure lysol gave the most satisfactory results. It forms a hard whitish eschar which is followed by healthy cicatricial tissue. Nodules are opened and the contents removed and cotton saturated with lysol inserted, and in a short time they are brought to recovery.

CLEMENS.

C.—METHODS OF EXAMINATION AND TREATMENT.

394. VON STEIN. A new dynamometrograph and ergograph and their importance for diagnosis in disturbances of the aural labyrinth.

395. BLEGVAD, N. Some remarks on Weber's test. *Arch. f. Ohrenhkl.*, vol. lxx., pp. 51-77.

396. MULERT. A new aural massage apparatus. *M. f. Ohrenhkl.*, 1906, No. 10, p. 656.

397. RICHTER. A new paracentesis needle. *M. f. Ohrenhkl.*, 1907, No. 1.

398. GUYOT, J. The indications for Bier's method in oto-rhinology. *Revue médicale de la Suisse Romande*, No. 5, 1906.

399. URBANTSCHITSCH. The therapeutic value of fibrolysin in middle-ear disease. *M. f. Ohrenhkl.*, 1907, No. 2.

400. WAGNER V. JAUREGG. Second report on the treatment of endemic cretinism with thyroid substance. *Wiener klin. Wochenschr.*, No. 6, 1907.

401. ALT. On new apparatus for improving the hearing. *Wiener med. Presse*, No. 9, 1907.

402. V. SCHRÖTTER. A new method of illuminating canals and cavities. *Berl. m. W.*, 1906, No. 47.

394. VON STEIN. A new dynamometrograph and ergograph and their importance for diagnosis in disturbances of the aural labyrinth.

Stein has devised a new apparatus which designates by a continuous curve the increase in power, its duration and decrease. Instead of a spring whose power, of course, becomes exhausted in time, a weight is used which hangs from a vertical rod. To raise the weight the power has to be increased the nearer the weight approaches the horizontal. The apparatus is described by numerous illustrations, and its simplicity, constancy, and the facility with which its results can be controlled are praised.

The dynamograms obtained from healthy individuals are first recorded, then those obtained from the diseased. The

curve at first rises vertically, which means that the muscle contracts rapidly. If the weight is raised to its maximum elevation then it remains for some time at this level, and a horizontal line is described whose length depends upon the working power of the individual. The weight and the curve then suddenly drop. The decrease is retarded though progressive, so that finally the curve becomes horizontal. A drop to zero has not been observed. The line of the progressive drop Stein calls "the negative working line"; the entire line of the drop is the "tetanic curve." After the first elevation the curve shows a distinct slight fibrillary movement, the expression of slight contractions of the muscular fibres. The negative working line is practically of importance. This enables one to determine the suitable weight for instruments, hammers, etc. The tetanically contracted muscle can then contract still further and the curve shows sharp saw-teeth with certain peculiarities. It was of importance for Stein to bring out the relation of changes in the muscular force with labyrinth disturbance after a diminution of muscular function had been observed in animals (Ewald). At this point the investigations of Wanner and Kümmler are described.

Stein has examined 21 cases of affections, first of the labyrinth, second of labyrinth and brain, third of the central nervous system, with the following findings:

The initial fibrillary movement of the tetanic curve can be but slightly pronounced or absent:

(a) in lesions of the labyrinth of one side, especially in contraction of the horizontal semicircular canals;

(b) on the side of the destroyed labyrinth;

(c) in labyrinth inflammation with tinnitus and vertigo but without a brain lesion;

(d) in lesions of the fibres of the eighth nerve;

(e) in amyotrophic lateral sclerosis;

(f) in over-extension of the muscle.

Facial impression had no influence on the absence or presence of the waves. In the absence or weakness of the movements of the waves a lesion of the aural labyrinth or of its centripetal tracts may be observed.

The ergotetanic curve may be weakly present or absent:

(a) during an inflammation of the labyrinth associated

with vertigo and tinnitus (no ergotetanic curve on the diseased side; a weak curve on the sound one);

- (b) on removal of the labyrinth on the affected side;
- (c) in lesions of certain fibres of the eighth nerve;
- (d) in amyotrophic lateral sclerosis;
- (e) in over-extension of the muscle;
- (f) in lesions of the medulla with normal hearing;
- (g) in lesions of the horizontal semicircular canals.

Facial impressions play an important rôle in the onset or absence of the ergotetanic curve.

In certain cases of lesions of the nervous system, the curve descends in varied degrees, which is never observed in disease of the ear or of the eighth nerve.

The curves in acromegaly are straight and uniform, which is never the case in labyrinth disease.

In disseminated sclerosis or in a persisting paralysis of the upper extremity, irregularly serrated and large waved curves are seen.

The final conclusions are the following:

1. The delicate wave movements show that certain parts of the labyrinth are intact.
2. Their absence points to severe lesions of certain parts of the labyrinth.
3. Poorly drawn curves show that the labyrinth is but little involved.
4. A suddenly descending curve shows disease of the brain.
5. A curve with irregular teeth and large waves shows brain disease.
6. A slowly ascending curve or one with waves shows a weakness of the muscle and is found in affections of the brain or of the labyrinth.
7. A short, irregular, or absent ergographic line is present in:
 - (a) labyrinth affections (with closed eyes);
 - (b) in certain labyrinth affections or those combined with central lesions.
8. In these affections peripheral affections of the muscles must not be overlooked. To confirm these observations many additional experiments are necessary.

BRANDT.

The examination of 366 telephone operators with normal ears, 8 with one-sided chronic otorrhoea, 26 with sequela of purulent otitis, and 7 suffering from cerumen, confirmed the view that Weber's test is a rather uncertain and unreliable method of examination.

ZARNIKO.

396. MULERT. *A new aural massage apparatus.*

This is an aural massage apparatus made by the "Electra" company in Berlin which employs the faradic current as a power.

WITTMACK.

397. RICHTER. *A new paracentesis needle.*

The new needle resembles a dagger with three edges and has a three-edged crown, and is made in five different sizes. The three-edged incision is rapidly executed and free from danger. The site of perforation remains open better than with the ordinary slit.

WITTMACK.

398. GUYOT. *The indication for Bier's method in otorhinology.*

Sondermann's suction apparatus is described and its use recommended in the treatment of acute suppurations of the middle-ear end of the accessory cavities, as well as to aid the diagnosis in empyema of the accessory cavities.

WITTMACK.

399. URBANTSCHITSCH. *The therapeutic value of fibrolysin in middle-ear disease.*

The remedy is administered subcutaneously beginning with a dose of 0.3ccm and gradually increasing to 2.3ccm. Twenty to 30 injections are given. Occasionally local and general reactions are observed. In addition to the injections an energetic local treatment should be instituted. Cases of chronic middle-ear catarrh, adhesive processes, and beginning oto-sclerosis are especially suited. In many cases the use of fibrolysin is of value even when preceding local treatment has remained valueless.

WITTMACK.

400. WAGNER V. JAUREGG. *Second report on the treatment of endemic cretinism with thyroid substance.*

The author describes cases in which poor hearing was very much improved. The earlier the cure is instituted the better

is the result. The disturbances of hearing in cretinism depend, according to Wagner, on tubal catarrhs, adenoid vegetations, and labyrinth disease. He believes that there are specific adenoid vegetations in cretinism which are influenced by the thyroid treatment. While in general no improvement was observed in labyrinth diseases, severe cases, if the treatment is given early enough, are not entirely uninfluenced.

WANNER.

401. ALT. *On new apparatus for improving the hearing.*

The various forms of artificial drums are described and the one invented by Gomperz, consisting of convolutions of chemically pure leaf silver, is especially recommended. These silver pellets are employed after radical operation when epidermization is complete. In addition to improving the hearing the superficial relapses are avoided and the silver convolutions are supposed to exert a certain bactericidal action.

A new hearing instrument is described which consists of a microphone, telephone, and dry cells with connecting wires. The microphone and telephone are so small that they may be held in one hand. The entire apparatus has a weight of 625g. On speaking into the microphone with the ordinary voice, the voice is heard by the telephone so increased as if one was yelling at the top of one's voice into the ear. This apparatus is of value in cases of marked deafness. In order to admit of conversing with a person at a distance, the telephone was equipped with a small hearing cap and the microphone with a sound-carrier. Patients who formerly could hardly hear conversation at 30cm were able with this instrument to converse at considerable distances.

WANNER.

402. V. SCHRÖTTER. *A new method of illuminating canals and cavities.*

The new method depends upon the principle of the transmission of light through a glass rod or a glass tube. On illuminating one end of the wall of a glass rod, the light is transmitted along the tube and the other end appears illuminated. At the proximal end of a glass tube which is surrounded by

a metallic mantel v. Schrötter arranged 4 small electric lamps, thus giving an intense illumination a short distance from the distal end of the tube. This method is not only suitable for examining the oesophagus and bronchi, but also for examining the ear, nose, naso-pharynx, antrum of Highmore, and other objects of endoscopic examination. MÜLLER.

d.—DEAFMUTISM.

403. IWANOW, A. The pathological anatomy of congenital deaf-mutism. *Russ. Monatsschr. f. Ohrenhkl.*, etc., March, 1907.

403. IWANOW, A. *The pathological anatomy of congenital deafmutism.*

In this patient the hearing and disturbances of equilibrium were examined during life, and after death a histological examination was made of the labyrinth. SACHER.

EXTERNAL EAR.

404. SELIGMANN, H. A method of operating for othæmatoma. *Arch. f. Ohrenhkl.*, vol. lxi., pp. 275-280

405. HAUG. On the so-called ossification of the auricle. *Monatsschr. f. Ohrenhkl.*, 1906, No. 12.

406. DALLMANN. Tumor of the external auditory canal (melanoma). *Arch. f. Ohrenhkl.*, vol. lxx., pp. 97-99.

407. KREBS, G. Unusual courses of circumscribed external otitis. *Therap. Monatshefte*, 1907, February.

408. SCHWARTZE, H. Death from meningitis after incorrect attempts to remove a stone from the ear. *Arch. f. Ohrenhkl.*, vol. lxx., pp. 110-116.

409. ARCHIPOW, A. On the causation of traumatic injuries of the drum in the soldiers of our army. *Wojenno Medizinski Shurnal*, December, 1906.

410. ARCHIPOW, A. On the treatment of dry perforation of the drum membrane with trichloracetic acid according to the method of Okunew. *Russ. Monatsschr. f. Ohrenhkl.*, etc., December, 1906.

411. RICHTER. Silk paper as a substitute for the drum membrane. *Monatsschr. f. Ohrenhkl.*, 1906, No. 11, p. 725.

404. SELIGMANN, H. *A method of operating for othæmatoma.*

Under local anæsthesia the skin over the othæmatoma is incised; the sac is then dissected out and removed *in toto* with the injured cartilage; bandaged with adhesive straps. Recovery without deformity. The microscopic condition is illustrated and confirms the utility of this method.

ZARNIKO.

405. HAUG. *On the so-called ossification of the auricle.*

Report of a case of very extensive ossification of the auricle after frost-bite with unusually large collection of wax in the diseased ear. After discussing the cases reported in literature, the author concludes that it would be more correct to speak of a calcification of the auricle rather than an ossification, because the process is the impregnation of the auricle with lime, not a transformation into true bony tissue.

WITTMACK.

406. DALLMANN. *Tumor of the external auditory canal (melanoma).*

Melanotic cutaneous nævus obstructing the auditory canal of a woman forty-four years of age. Removal with the galvanocaustic snare. Microscopic reports concerning the malignancy of the growth demand further observation of the case.

ZARNIKO.

407. KREBS. *Unusual courses of circumscribed external otitis.*

The author reports a number of complications of external otitis which he has observed, such as an osseous fistula in the posterior bony canal wall, abscess of the canal which perforated under the periosteum of the mastoid process, and a subperiosteal abscess of the mastoid process with superficial caries.

BRÜHL.

408. SCHWARTZE. *Death from meningitis after incorrect attempts to remove a stone from the ear.*

A boy, five years of age, inserted a pebble into his ear. Attempts at extraction by unpractised hands forced the stone deeper into the ear. The drum membrane was perforated, there were otitis and periostitis at the round window, labyrinthitis, purulent meningitis (internal hydrocephalus), purulent infiltration of the choroid plexus, double pneumonia; death.

In a similar case the author recommends that the operative removal of the foreign body should not be delayed until fever and distinct symptoms of meningeal inflammation are present, and considers continuous severe pain in the ear a sufficient indication for immediate operation.

ZARNIKO.

409. ARCHIPOW. *On the causation of traumatic injuries of the drum in the soldiers of our army.*

Seventeen cases are reported of injuries to the drum membrane by blows on the ear, 10 accidental injuries, and 5 cases of artificial perforation of the drum membrane to obtain release from military service. SACHER.

410. ARCHIPOW. *On the treatment of dry perforation of the drum membrane with trichloroacetic acid according to the method of Okunew.*

Twenty-nine perforations were treated, of which 12 were cicatrized, 4 diminished in size, 13 remained unimproved. In 4 cases the otorrhœa recurred. SACHER.

411. RICHTER. *Silk paper as a substitute for the drum membrane.*

To employ silk paper as an artificial ear drum it should be impregnated with paraffine fat, then pasted on the remains of the drum membrane with rosin and covered with a layer of powder. It is important that this paper splint should close the perforation completely. The artificial drum is especially adapted in dry central perforations. WITTMACK.

MIDDLE EAR.

a.—ACUTE OTITIS.

412. SPIRO. *The conservative treatment of acute otitis according to the Bier-Klapp method.*

413. BARATOUX, J. *Paralysis of the external motor oculi in the course of otitis.* Paris, 1907.

414. GRADLE, H. *The odor as a guide in the treatment of chronic suppuration of the middle ear.* *Jour. Am. Med. Assn.*, November 24, 1906.

415. BRYANT, W. SOHIER. *The radical operation modified to allow the preservation of normal hearing.* *N. Y. Med. Journ.*, October 20, 1906.

416. HAMMOND, PHILIP. *Technic in the after-care of the radical mastoid operation.* *Jour. Am. Med. Assn.*, November 17, 1906.

412. SPIRO. *The conservative treatment of acute otitis according to the Bier-Klapp method.*

The congestion bandage was applied by the author only in cases of acute otitis. He believes in general to have obtained better results than by any other method. If the

otitis is accompanied by local changes about the ear, after the congestive hyperæmia Klapp's suction apparatus is applied. A small puncture down to the bone is made where there are swelling and painful fluctuation of the soft parts over the mastoid process. The dry cupping is applied two or three times a day for 5 to 10 minutes in intervals of 5 minutes. It is dangerous to prolong the use of the method when there are symptoms of fever and intracranial complications.

WANNER.

413. BARATOUX. *Paralysis of the external motor oculi in the course of otitis.*

In this excellent monograph a complete review is given of the cases reported in the literature from 1896 to 1906, of abducens paralysis occurring in the course of otitis. This report shows that the cases are not infrequent. In more than half, the patients had not reached the twenty-fifth year. In most of the cases the abducens paralysis was isolated; occasionally, however, it was associated with paralysis of the 3d and 4th nerves and with optic neuritis, choked disk, and nystagmus. A full discussion of the theories follows. Post-mortem examinations have added no new information.

Conclusions: Abducens paralysis in ear disease can be caused by: 1. Reflex processes. 2. Infectious neuritis. 3. Intracranial lesions. 4. Local lesions at the apex of the petrous pyramid.

BRANDT.

414. GRADLE, H. *The odor as a guide in the treatment of chronic suppuration of the middle ear.*

It has been shown that offensive odor in these cases is due to anaërobic bacilli, and the decomposition of the discharge is an important factor in prolonging the suppuration. The odor test is made use of in the following way: In every case where there are no urgent symptoms necessitating prompt operation, the ear is washed out until no evidence of discharge or debris is seen, and boric-acid powder is then lightly blown in. In successful cases the odor disappears permanently after two or three treatments. This class of cases requires no operation as the suppuration is cured in from one to three weeks, although re-infections from the throat may occur. If

this boric-acid treatment fails to remove the odor in the course of a few days, operation is then considered necessary.

CLEMENS.

415. BRYANT, W. SOHIER. *The radical operation modified to allow the preservation of the normal hearing.*

The modification suggested by Dr. Bryant is applied more especially to those cases having good hearing up to a short time before surgical work is undertaken. In addition to removing all carious bone, a U-shaped myringotomy is made to properly drain the epitympanum. In removing the outer-anterior osseous wall of the antrum, sufficient bone should be left to support the annulus with the adjacent membrana tympani. The suspensory ligament of the malleus and the fan-shaped ligament of the incus must be protected from injury. The upper and back part of the tympanum is drained through the mastoid wound and the lower anterior part through the meatus.

The case reported was operated on in this way; the ossicles and their attachments were not disturbed. On the sixteenth day thereafter, the hearing was 13 in.; on the 173d day, 46 in.; on the 253d day, 72 in.

CLEMENS.

416. HAMMOND, PHILIP. *Technic in the after-care of the radical mastoid operation.*

After the usual thorough bone operation, the posterior wound is sutured tightly and allowed to heal by primary union. About one week thereafter, a large single-graft application is made and the case is left untouched for some time.

CLEMENS.

b.—CHRONIC PURULENT OTITIS.

417. LAUFFS. On proteus vulgaris in purulent otitis. *Arch. f. Ohrenhkl.*, vol. lxx., pp. 90-99, 187-204.

418. JAUMENNE. A case of mastoid operation performed without anesthesia and without pain. *Arch. internat. d'otol.*, etc., vol. xxii., No. 3.

419. MOURET, J. Reflections on mastoid operations. *Revue hebdomadaire de laryngologie, d'otologie et de rhinologie*, August, 1906.

420. ALEXANDER, G. On the technic of the plastic closure of retroauricular openings. *Arch. f. Ohrenhkl.*, vol. lxx., pp. 117-120.

421. ALT, F. On the operative treatment of otitic facial paralysis. *Wiener klin. Wochenschr.*, No. xliii., 1906.

417. LAUFFS. *On proteus vulgaris in purulent otitis.*

In 26 cases of simple and radical operations the proteus vulgaris was found in 6; in 2 of these in pure culture, in 3 with streptococcus, and once with streptococcus and diplococcus. Severe complications were always present: in one, abscess of the temporal lobe and cerebellum; in 3 perisinusoidal abscesses, one subdural abscess, and one cerebellar and occipital abscess with associated sinus thrombosis. In 3 death ensued.

The unpublished investigations of Bischoff on the same organism are also given. This author found the proteus present in 5 out of 52 cases. In 2 there was cerebellar abscess, in one sinus phlebitis, and in one extradural abscess.

The proteus vulgaris was found present in 11 cases out of 78—14%. These were nearly always cases of cholesteatoma. In 10 there were severe intracranial complications. The author does not regard the proteus vulgaris as the harmless saprophyte it is usually considered; especially where the cholesteatoma has destroyed the bone toward the brain its action may be deleterious.

Clinically it is characterized by the production of a very disagreeable putrid odor.

ZARNIKO.

418. JAUMENNE. *A case of mastoid operation performed without anæsthesia and without pain.*

A patient forty-four years of age suffering from chronic purulent otitis presented an unusual degree of analgesia of the auditory canal, of a part of the auricle, and of the retroauricular region. There were some irregularly outlined analgesic areas in the face. After a general examination, the diagnosis of hysteria was made and radical operation was performed without any anæsthesia and without causing the patient any pain.

OPPIKOFER.

419. MOURET. *Reflections on mastoid operations.*

In disease of the mastoid process, especially when the posterior part is involved and the so-called radical operation is necessary, the author recommends, in addition to the usual

vertical incision, a second horizontal one. A temporary retro-auricular opening is thus formed which usually closes of itself as the interior of the cavity becomes epidermized.

SUCKSTORFF.

420. ALEXANDER. *On the technic of plastic closure of retro-auricular openings.*

Modification of Passow's plastic operation. It differs from this method in that the two rows of sutures do not lie over each other but side by side.

ZARNIKO.

421. ALT. *On the operative treatment of otitic facial paralysis.*

The facial nerve in general shows a great tendency to degenerate; about one eighth of the cases of facial paralysis remains permanent. In these cases an anastomosis with the spinal accessory and the hypoglossal nerves is indicated when the paralysis has existed for six months and a return of the electric irritability is not present. The grafting is indicated in cases of labyrinth necrosis when in removing the sequestrum a long piece of facial nerve is sacrificed.

A case is reported where after removal of a freely movable labyrinth sequestrum the facial nerve became completely paralyzed. Four weeks later the facial and hypoglossal nerves were united. After three months the asymmetry of the face in repose was corrected: it was still noticeable on speaking and laughing. Slight atrophy in the right half of the tongue.

After reviewing the cases described in literature the author concludes as follows:

The paresis or paralysis occurring after operation in the structure of the spinal accessory or hypoglossal nerves is usually transitory and not marked. Active movements can at first only be carried out by associated movements of the shoulder and tongue. After prolonged exercise the movements become disassociated.

In injury of the facial nerve during operation the Fallopiian canal in the posterior and upper part of the tympanum should be exposed and the injured nerve is to be embedded in the sulcus of the canal. This same procedure is followed

in the radical operation if the facial nerve has been paralyzed by suppuration.

WANNER.

C.—DISEASES OF THE SINUSES.

422. KÜMMEL. On general septic infection secondary to the ear. *Mitteilung aus den Grenzgebieten der Med. u. Chirurgie*, 1907, III. Supplementband.

423. ZEBROWSKI. On the curability and operative treatment of otitic pyæmia. *Monatsschr. f. Ohrenhkl.*, 1906, No. 12.

424. SCHAAF. Reports of cases of sinus thrombosis. *Dissert.*, Giessen, 1906.

425. MOURE. Several cases of purulent phlebitis of the lateral sinus. *Presse otolaryngologique Belge*, 1906, No. 11.

426. SCHLEGEL. A case of bilateral sinus thrombosis with one-sided ligature of the jugular vein. *Arch. f. Ohrenhkl.*, vol. lxix., pp. 176-185.

427. STRAZZA. A case of primary thrombosis of the left jugular bulb. Operation; recovery. *Arch. Italiano di otologie*, etc., vol. xviii., No. 1.

428. JOUTY. A case of sinus and bulb thrombosis. *Annales des mal. de l'or*, etc., March, 1907.

429. LUC. Indications for exposing the jugular bulb after ligation of the jugular vein. *Annales des mal. de l'or*, etc., March, 1907.

422. KÜMMEL. On general septic infection secondary to the ear.

A critical description of 12 personally observed cases of otitic sinus disease. Eight of these were cured by operation. Nearly every one of the case histories presents interesting details. The principal symptoms which the author mentions are pain on swallowing in disease of the jugular bulb from involvement of the 9th nerve. The question whether pyæmic fever can develop without sinus disease remains open. Rigors indicate a sudden overwhelming of the general circulation with toxins; transmission of an infected thrombus. A proper bacteriological examination of the blood from the general circulation, from the sinus, and from the thrombus is of great importance. The treatment should under no condition be schematic. If sinus disease is suspected, the sinus should be opened even if the appearance is negative. If a thrombus is present, it should be removed irrespective whether the torcular posteriorly or the bulb below furnish a limit. The jugular vein should be opened when its contents are in-

fectious and there is no complete limiting thrombus at the bulb. If there is no thrombus in the sinus, collargol is recommended in the septic form; in the pyæmic form the jugular bulb and vein should be opened. BRÜHL.

423. ZEBROWSKI. *On the curability and operative treatment of otitic pyæmia.*

Report of 6 cases of sinus thrombosis, of which 4 were cured and 2 died. The method of operation depends upon the severity of the disease and upon the anatomical changes which are found in the temporal bone and in the venous sinuses at operation. The complete removal of the diseased focus in the temporal bone and the exposure of the transverse sinus is sufficient in many cases to control the pyæmic process. Polyvalent antistreptococcus serum exerted a very favorable influence on the post-operative course in one case. The onset of symptoms indicative of cavernous sinus thrombosis are signs of early death. WITTMACK.

424. SCHAAF. *Reports of cases of sinus thrombosis.*

Twelve cases of sinus thrombosis are reported from the clinic in Giessen (Leutert), of which one was healed at the time of operation, 3 deaths, and 8 recoveries. Of the 12 cases, 6 were chronic, 2 acute, and 4 subacute otitis. In 3 cases it was possible in 2 to exclude meningitis by lumbar puncture. Among the 12 cases there were 3 of peribulbar or peri-jugular suppuration from destruction of the bulb wall. HARTMANN.

425. MOURE. *Several cases of purulent phlebitis of the lateral sinus.*

The author discusses the question of the pulsation of the infected sinus and after ligation of the jugular vein. The author found that the infected sinus pulsates usually in a pronounced manner and synchronous with the pulse beat; on the other hand, a sinus which pulsates is regarded as diseased. Ligation of the non-infected jugular vein is an unnecessary operation and is not sufficient to retard the infection originating from purulent inflammation of the lateral sinus. BRANDT.

426. SCHLEGEL. *A case of bilateral sinus thrombosis with one-sided ligation of the jugular vein.*

Patient, female, twenty-six years of age, suffering from left-sided otitis and mastoiditis. October 19th, simple operation. November 4th, secondary operation on account of pain and fever. A number of diseased zygomatic cells are exposed and the dura in the floor of the middle cranial fossa laid bare. The pain increased. November 7th, the temporal lobe was punctured without result. The thrombosed sinus was resected. Pain persisted and the general condition grew worse. November 14th, puncture of the cerebellum without result. The signs of a right-sided sinus thrombosis with pulmonary metastases become evident. December 5th, ligation of the jugular vein on the right side. The poor general condition continues. December 30th, right nerve deafness. In the beginning of January, double choked disk and right paralysis of the recurrent nerve. In the middle of January the general condition improved. Gradual healing of the operative wound. The recurrent paralysis persisted.

It strikes the reviewer as remarkable that the author believes that the operation on the jugular bulb could have prevented the extension of the thrombus from the original affected side. The author himself states that the thrombosis extended by way of the torcular.

ZARNIKO.

427. STRAZZA. *A case of primary thrombosis of the left jugular bulb. Operation; recovery.*

A patient thirteen years of age, after an acute purulent otitis, exhibited pyæmic symptoms which disappeared after removing septic thrombi from the bulb.

In the general remarks which follow this report the diagnosis of jugular-bulb thrombosis is discussed. The symptoms are pain and swelling in the retromaxillary groove with irritation and paralytic disturbances in the area of distribution of the ninth, tenth, and eleventh nerves. Primary isolated bulb paralysis is unusual.

RIMINI.

428. JOUTY. *A case of sinus and bulb thrombosis.*

The thrombosed sinus was opened nearly to the bulb, which contained pus. The jugular vein was tender, but it was not

ligated, though pyæmic attacks continued for weeks after operation. Finally, recovery notwithstanding pulmonary and articular metastases. Of interest is the retardation of the pulse: temperature from 36° to 36.5° C. with a pulse of 48 to 50; temperature 40° to 40.8° with a pulse not higher than 76 in a fourteen-year-old patient. This remarkable retardation of pulse suggesting a brain abscess was the expression of an irritation of the vagus nerve in the jugular foramen.

BOENNINGHAUS.

429. LUC. *Indications for exposing the jugular bulb after ligating the jugular vein.*

A severe case of Bezold's mastoiditis with many deeply seated abscesses in the neck, complicated by peripheral puriform bulb thrombosis. Notwithstanding five operations during three weeks of illness no cessation of fever until death, which followed after a coma of a number of hours introduced by an epileptiform attack. No autopsy. The author does not think that a brain abscess was present, because extensive incisions of the brain substance were negative. He is more inclined to regard the possibility of a ventricular hemorrhage from stasis after ligation of the jugular vein, which preceded the coma by eight days, especially as the right jugular and the facial vein were ligated.

BOENNINGHAUS.

d.—CEREBRAL COMPLICATIONS.

430. MULLEN, JOS. Abscess of the temporo-sphenoidal lobe; report of a case. *Texas State Jour. of Med.*, October, 1906.

431. SPILLER, WM. G. Abscess of the brain. *Univ. of Penn. Med. Bulletin*, October, 1906.

432. CITELLI. A case of extensive extradural perisinus abscess which perforated externally. *Arch. ital. di otologia*, etc., vol. xviii., No. 2.

433. TRÉTRÔP. Enormous abscess of the brain following purulent otitis. *La presse oto-laryngologique Belge*, vol. ix., 1906.

434. VOSS. Multiple brain abscesses in simultaneous purulent otitis and purulent bronchitis. *A. d. Gebiete des Milit. Sanitätsw.*, No. 35.

435. LANNOIS, M. and PERRETIÈRE, A. Otitic meningitis and its cure. *Arch. internat. d'otol.*, etc., vol. xxii., No. 3.

436. JACKSON. Meningism as opposed to meningitis. *Arch. internat. d'otol.*, etc., vol. xxiii., No. 1.

430. MULLEN, JOS. *Abscess of the temporo-sphenoidal lobe; report of a case.*

Patient, male, aged seven, had had scarlet fever three years previously, in which attack both ears became involved. A sudden cessation of the discharge in the right ear followed by convulsions made operation imperative. Total destruction of the membrana tympani and the ossicles was present. During the Schwartz-Stacke operation, an abscess was located in the temporo-sphenoidal lobe by the use of a grooved needle; the cavity contained about one and a half drams of pus. Owing to the age and impossibility of controlling the case the daily dressings were made under chloroform. Iodoform gauze was not introduced into the abscess cavity until the fifth day. The case was in the hospital 43 days and during this time was chloroformed 42 times. Leucocytosis was pronounced which became less and less as the drainage improved. Forty days after being discharged from the hospital, the patient was found to be in perfect health. CLEMENS.

431. SPILLER, WM. G. *Abscess of the brain.*

There are five cases reported by the author. The first case was one of sinus thrombosis, with symptoms of brain abscess, in a youth, fifteen years of age, who made a perfect recovery. The second case was one of otitis media of long standing, symptoms of brain abscess of short duration, which occurred in a man sixty-eight years of age. Death followed in three days after the evacuation of a spheno-temporal abscess. The third case was one of cerebellar abscess from occlusion of the posterior inferior cerebellar artery unrecognized during the patient's life. At the autopsy were found embolism and aneurysm of the left posterior inferior cerebellar artery, fibrosis of the left cerebellar hemisphere, two abscesses of the left cerebellar lobe. The fourth case was one of tuberculous meningitis causing symptoms of brain abscess. The fifth case was one of abscess of the left temporal lobe in a left-handed person, and, although the abscess was successfully evacuated, the patient died. CLEMENS.

432. CITELLI. *A case of extensive extradural perisinus abscess which perforated externally.*

Two months after recovery from an acute purulent otitis, the patient, thirty-seven years of age, suffered from headache on the side of the diseased ear. At a point 5cm behind the antrum and 1 to 2cm above, there was a slight fluctuating swelling. The operation revealed an abscess extending from the sigmoid sinus posteriorly to the torcular, which had evacuated itself through a small opening posteriorly behind the mastoid process.

RIMINI.

433. TRÉTRÔP. *Enormous abscess of the brain following purulent otitis.*

After the report of a case of large brain abscess following otitis, the author gives his views on operations on the mastoid process. Tenderness in any joint is an indication for operation. The only constant symptom of intracranial complication is the headache; all the other symptoms may be absent. Though it is not always easy to diagnose endocranial complication, it is still more difficult to designate its situation, for abscesses of the cerebellum and of the cerebrum may furnish similar symptoms with various forms of meningitis.

BRANDT.

434. Voss. *Multiple brain abscesses in simultaneous purulent otitis and purulent bronchitis.*

A child, three years of age, following a right-sided acute otitis vomited, and there were convulsive seizures of the left half of the body. The clinical supposition that there was an abscess in the area of the right motor region was confirmed at autopsy. There were found 9 abscesses as large as peas in the region of the upper extremity of the central sulcus. They were clearly not accessible at operation on the temporal bone where a cutaneous periosteal bone-flap was made. As the child also suffered with purulent bronchitis it was not possible to determine the otitic origin of the brain abscess. Notwithstanding the distant position of the abscess from the middle ear, the infection of the brain might have followed the vessels.

BRÜHL.

435. MANNOIS and PERRETIÈRE. *Otitic meningitis and its cure.*

In a patient sixteen years of age, a right-sided chronic

otitis was followed by meningitis and cerebellar abscess. The meningitis was confirmed by lumbar puncture and at autopsy. The cerebellar abscess was not found until at autopsy. After opening the mastoid process and after puncture of the temporal lobe, the general condition improved for 12 days, and on a second later lumbar puncture the previously cloudy fluid was found clear. The authors, therefore, think that from this case they are entitled to believe that purulent meningitis may be curable. The cases of cures of purulent meningitis recorded in literature are described.

OPPIKOFER.

436. JACKSON. *Meningism as opposed to meningitis.*

Infections, intoxications, teething, intestinal worms, gastric and intestinal disturbances, and otitis may produce the symptoms of meningitis without a true meningitis being present. The author has observed 62 of these cases and the various symptoms are described.

OPPIKOFER.

e.—OTHER MIDDLE-EAR DISEASES.

437. McREYNOLDS. *Case of acute mastoiditis complicated by ulceration and rupture of the œsophagus.* *Texas State Jour. of Medicine*, October, 1906.

438. BLUMER, E. M., and GERMAIN, H. H. *Modification of the simple mastoid operation which shortens convalescence by facilitating wound repair.* *Jour. Am. Med. Assn.*, November 24, 1906.

439. GUÉRIN. *Hematotympanum.* *Annales des mal. de l'or*, February, 1907.

440. URBANTSCHITSCH. *The treatment of chronic catarrhal otitis.* *Wiener klin. therapeut. Wochenschrift*, No. 6, 1907.

441. MAHLER. *Cancer of the ear.* *Arch. internat. d'otol.*, etc., vol. xxii., No. 2.

437. McREYNOLDS, J. O. *Case of acute mastoiditis complicated by ulceration and rupture of the œsophagus.*

This case appeared to be a plain acute mastoiditis which followed a subacute involvement of the middle ear. Shortly after a mastoidectomy the patient went into a condition of extreme shock during which he died. At the autopsy it was found that death was due to a complete rupture of the œsophagus, three inches in length at the lower third, following an extensive ulceration. No strain of any kind had been placed

upon the œsophagus on the morning of the rupture, for the patient had eaten practically no food for almost one week.

CLEMENS.

438. BLUMER, E. M. and GERMAIN, H. H. *Modification of the simple mastoid operation which shortens convalescence by facilitating wound repair.*

The method suggested by the authors differs from the original operation by removing the posterior osseous canal wall and a part of the roof and floor of the bony canal; and the pressing back of the soft structures into the cavity thus made. Ten cases are reported operated on by this method, of which one recovered in seven (7) days, the longest period of convalescence being seventeen (17) days. After the wound has been thoroughly packed with gauze, the mastoid incision is closed with sutures and the usual dressings are applied; a small gauze wick is allowed to remain in position until the soft parts become adherent to the bony walls. Adhesion is looked for at the first dressing subsequent to the operation.

CLEMENS.

439. GUÉRIN. *Hematotympanum.*

A case of spontaneous hemorrhage into the tympanum is added to the few previously reported in literature. A woman, fifty years of age, suffered suddenly from pain in the ear, tinnitus, and vertigo, and at the same time there was a discharge of bloody mucus from the nose and pharynx. The very dark red drum is bulging. The exudate is absorbed in two weeks.

BOENNINGHAUS.

440. URBANTSCHITSCH. *The treatment of chronic catarrhal otitis.*

This extensive paper contains principally the author's experiments with the injection of fibrolysin. Subcutaneous injections are made commencing with 0.3, then 0.6, 1.0, 1.5, 2.0, and 3.0g. If after 8 to 10 injections no improvement results, the treatment is abandoned. If there is improvement, 20 to 50 injections are practised, generally three times a week. A favorable result should include improvement in the hearing as well as in the subjective noises.

WANNER.

441. MAHLER. *Cancer of the ear.*

Middle-ear carcinoma in a woman fifty years of age. It is undecided whether suppuration preceded the cancer. There was facial paralysis. Operation and X-ray treatment without result. Ten months after the onset of extremely severe aural pain, death from cachexia. The individual symptoms of the disease are fully described.

OPPIKOFER.

NERVOUS APPARATUS.

442. STEIN. A case of non-purulent affection of the right labyrinth. Destruction of the end apparatus. Results. A new function of the labyrinth. *Russ. Monatsschr. f. Ohrenhkl.*, etc., November, 1906.

443. LACHMUND. On nervous disturbances of hearing. *Monatsschr. f. Psychatrie u. Neurologie*, vol. xx.

444. HENNEBERT. Clinical contributions to the study of labyrinthism. *Arch. internat. d'otol.*, etc., vol. xxiii., No. 1.

445. ALEXANDER. Progressive deafness from atrophy of Corti's organ. *Arch. internat. d'otol.*, etc., vol. xxii., No. 3.

446. BERENT. Circumscribed changes in the trunk of the cochlear nerve (gray degeneration or post-mortem artefact?) with partial atrophy of the ganglion cells in acute loss of hearing in a tuberculous patient. *Monatsschr. f. Ohrenhkl.*, 1906, No. 11.

447. PANSE. Clinical and pathological contributions. *Arch. f. Ohrenhkl.*, vol. lxx., pp. 15-27.

442. STEIN. A case of non-purulent affection of the right labyrinth. Destruction of the end apparatus. Results. A new function of the labyrinth.

The contents of this extremely interesting article cannot be briefly reviewed.

SACHER.

443. LACHMUND. *On nervous disturbances of hearing.*

From the standpoint of the neurologist the diagnosis of the seat of central ear disturbances is discussed with the air of a schematic construction of the course of the central hearing tract. The cases from the literature are reviewed. Of great interest is the comparison between the central disturbances of hearing and of vision. This interesting paper cannot be briefly reviewed.

KÖRNER.

444. HENNEBERT. *Clinical contributions to the study of labyrinthism.*

With the aid of 9 cases, whose histories are briefly given,

the symptoms of inflammation of the labyrinth are briefly described.

OPPIKOFER.

445. ALEXANDER. *Progressive deafness from atrophy of Corti's organ.*

A patient sixty-three years of age, who could no longer hear conversation with the left ear and with the right only at 15cm, presented the following histological findings: In the right ear there was an atrophy of Corti's organ and the stria vascularis; on the left side the changes were more pronounced, Corti's organ and the stria vascularis being absent; the spiral ganglion and the cochlear nerve were atrophic. The left side presented a more advanced stage than the right. The atrophy of Corti's organ, as the examination of the right ear shows, is the primary change, then follows the atrophy of the associated nerves.

OPPIKOFER.

446. BERENT. *Circumscribed changes in the trunk of the cochlear nerve (gray degeneration or post-mortem artefact?) with partial atrophy of the ganglion cells in acute loss of hearing in a tuberculous patient.*

The title describes the contents. As regards the circumscribed degenerations, the author agrees with Manasse that the pathological degenerations in the nerve trunk may favor the effect of traction. In the degenerated areas the fibres are more easily torn, where then each focus develops. These areas can be regarded as the terminal effects of the action of intra-vitam degeneration as well as post-mortem artefacts.

WITTMACK.

447. PANSE. *Clinical and pathological contributions.*

Cerebral deafness from fibro-sarcoma on the internal surface of the left occipital lobe in the distribution of the fusiform gyrus. Cerebellar deafness from tumor in the posterior cranial fossa. Auditory nerve deafness from secondary degeneration of the spiral ganglion and of Corti's organ. Destruction of the left ear from carcinoma.

ZARNIKO.

ARCHIVES OF OTOLOGY.

OTALGIA CONSIDERED AS AN AFFECTION OF THE SENSORY SYSTEM OF THE SEVENTH CRANIAL NERVE.¹

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(With two illustrations on Text-Plate III.)

INTRODUCTION.

THE object of the present study is to show the relationship of otalgia to the seventh cranial nerve; not of the facial nerve proper, but of its sensory system, which consists of the nerve of Wrisberg, the geniculate ganglion, and the petrosal nerves (great and small superficial petrosal, great and small deep petrosal, and the external petrosal nerves); also that otalgia bears the same relation to the facial nerve as does prosopalgia to the trifacial, and that in the facial nerve is to be found a sensory and reflex factor of great importance in the innervation of the auditory mechanism. Save for an uncertain relation to the taste fibres of the chorda tympani, the sensory mechanism of the facial has played no rôle in symptomatology, and has not had attached to it any definite sensory functions.

In nearly all modern treatises on otology are to be

¹Read in abstract before the Section on Otology, New York Acad. Med., Oct. 11, 1907.

found descriptions of the various clinical forms of otalgia, a large group of non-inflammatory earaches. These have been subdivided into primary otalgia, reflex otalgia, and secondary or herpetic otalgia. The pain is neuralgic in character and sharply circumscribed to the structures of the ear; it may be localized in the auricle, the auditory canal, or in the depths of the ear. Following the distribution of the pain, various groups of nerves are supposed to represent the underlying anatomical basis. Thus there are described neuralgia of the tympanic plexus; of the plexus of the Eustachian tube; of the auricular branches of the trigeminus; and of the auricular branches of the cervical nerves. A pain, if situated in the depths of the ear, is referred to the tympanic plexus; when on the anterior surface of the auricle, to the trigeminus; and when on its posterior surface, to the cervical plexus. While it cannot be denied that pain in the auricle may accompany the paroxysms of tic douloureux and occipito-cervical neuralgia, it would seem rather forced to ascribe to either of these large distributions a sharply circumscribed otalgia which shows no tendency to diffusion or extension into other areas.

A careful consideration of the prevailing views will show that the subject of otalgia is by no means clear, and that a well defined anatomical basis does not exist; furthermore, that we are very far from having a satisfactory understanding of many reflex aural neuroses described in otological literature. I believe that the introduction of the facial nerve into the realm of otalgia, and its evident sensory importance in the auditory mechanism, will supply an important key to the solution of these problems.

My attention was first directed to this subject by a study of the herpetic pain in cases of herpes zoster of the ear. This group of cases described under the title of Herpes Zoster Auris, or Herpes Zoster Oticus, is dependent upon a specific inflammation of the geniculate

ganglion of the facial nerve, situated in the depths of the internal auditory canal.¹

In this localization of zoster the pre- and post-herpetic pains are often very severe and intractable; so severe in some cases, that trained otologists have incised the tympanum suspecting a middle-ear complication. These pains are variously referred to the surface of the auricle, the auditory canal, or the depths of the ear,—the same distribution, approximately, as occurs in idiopathic and reflex otalgia.

Should there exist anywhere in the nervous system a sensory ganglion, the peripheral or surface representation of which was unknown or doubtful, the distribution of the pains following a circumscribed lesion of this ganglion would serve as a most valuable guide. Such a ganglion of unknown representation have we in the geniculate; and such a circumscribed lesion have we in herpes zoster—an affection dependent upon a specific inflammation of sensory ganglia of the spinal type. It is for this reason that I attach paramount importance to the distribution of the pain in herpes oticus, as giving the cue to the pain distribution and representation of this sensory system. I would particularly emphasize the fact that these pains are referred to the auricle, auditory canal, and depth of the ear; in other words, in the same area of localization as is found the otalgia of idiopathic or reflex origin, which heretofore have been relegated to the trigeminus, the cervical, or the tympanic plexuses.

ANATOMICAL CONSIDERATIONS.

I would here give in brief a few facts from anatomy and embryology bearing on the sensory mechanism of the facial nerve, which serve to emphasize its close relation to the auditory mechanism. The facial nerve, in the

¹ "Herpetic Inflammations of the Geniculate Ganglion. A New Syndrome and its Complications." By J. RAMSAY HUNT.—*Jour. of Nerv. and Ment. Dis.* (Feb., 1907), and *ARCH. OF OTOTOLOGY*, vol. xxxvi., No. 4, 1907.

primitive forms of life, is the nerve of the first branchial or ear cleft (the spiracle). From the ear cleft are developed the structures of the middle and external ear. Not only is there this relation to the conducting mechanism of the ear, but both the 7th and 8th nerves spring from a common ganglionic outgrowth of the neural ridge (the ganglion acustico-facialis). From the ganglion acusticum, which joins the otic vesicle, are developed the ganglia of Corti, Scarpa, and the auditory nerve. The ganglion faciale is represented at a later period of development by the geniculate ganglion, from which is developed the *pars intermedia* or nerve of Wrisberg; so that in developmental processes there is found a most intimate relationship between the facial nerve and its ganglion, the ganglia of the acoustic nerve, and all those structures which go to form the auditory mechanism.

Anatomically, the facial is a mixed nerve, as are the 5th, 9th, and 10th nerves, having a motor and a sensory root and ganglion. Its ganglion, the geniculate, is situated at the entrance to the aqueduct of Fallopius, in the depths of the internal auditory canal. This structure contains cells of the so-called spinal type, and is the homologue of the Gasserian ganglion and the posterior root ganglia of the spinal cord. There passes from it centripetally the nerve of Wrisberg (Fig. 2) on its way to the medulla oblongata, lying between the 7th and the 8th nerves. This represents the sensory root of the 7th. The distal or peripheral branches of the ganglion are three in number (Fig. 1).

1. The great superficial petrosal nerve; passing to Meckel's ganglion on the second division of the 5th, giving off in its course a branch which enters into the formation of the tympanic plexus (*the great deep petrosal nerve*).

2. The small superficial petrosal nerve; which passes to the otic ganglion on the third division of the 5th, likewise giving off in its course a branch to the tympanic plexus (*the small deep petrosal nerve*).

3. The external petrosal nerve, which enters into the formation of the carotid plexus of the sympathetic system.

In addition to these three divisions on the distal side of the ganglion, sensory fibres are also found coursing in the facial nerve proper in its passage through the Fallopian canal (I would recall, in this connection, the frequency of ear pain in cases of Fallopian neuritis of the 7th nerve). Furthermore, the nerve of Wrisberg, just above the ganglion, is connected with the auditory nerve proper by several fine filaments (Fig. 2).

The Plexus Tympanicus (Fig. 1),

in addition to the great and small deep petrosal nerves, both of which stand in relation to the geniculate ganglion, has entering into its formation the tympanic branch of the glosso-pharyngeal nerve (*Jacobson's nerve*), so that the tympanic plexus is composed of the terminal branches of Jacobson's nerve—from the 9th, and the small and large deep petrosal nerves of the sensory mechanism of the 7th.

In the medulla, the nerve of Wrisberg enters the fasciculus solitarius and terminates in the same manner and in close relation to the sensory roots of the 5th, 9th, and 10th nerves.

Zoster Zone.

The Zoster Zone of the geniculate ganglion, as shown by an analysis of the cases of herpes oticus, is to be found on the tympanic membrane, in the auditory canal, in the concha, and in an adjacent marginal area of the external ear. It is not to be inferred that this entire area in question is represented by the geniculate alone. The innervation of the interior of the auricle is a very complex one, the auricular branches of the trigeminus, of the cervical nerves, and the vagus participating; so that overlapping and great variability must necessarily result, but a study of the distribution of the eruption in

geniculate zoster teaches us that it must participate to a greater or less extent in the innervation of this area.

From this brief resumé it will be seen that the 7th nerve has the following sensory relations with the structures of the auditory mechanism:

1. With the *internal ear* by connecting filaments with the auditory nerve.
2. With the *middle ear* by petrosal branches to the mucous membrane of the tympanic cavity.
3. With the *external ear* by cutaneous fibres passing to the tympanic membrane, the auditory canal, and the interior of the auricle.

I therefore believe that the geniculate and its peripheral divisions play a central and important part in the innervation of the structures of the auditory mechanism; at the same time recognizing the part played by the auricular branches of the trigeminus, glosso-pharyngeal, vagus, and cervical nerves in the complex innervation of the same area.

Symptomatology of Ootalgia.

Ootalgia, as its name implies, is a neuralgic affection of the ear. The pain may be more or less constant in character, with exacerbations, or it may assume a distinctly intermittent type (*otalgia intermittens*). It may be localized in the depths of the ear, in the auditory canal, or on the surface of the auricle itself, and in some cases has been associated with hyperæsthesia and vaso-motor changes. A *Valleix* tender point is occasionally present in front of the anti-tragus.

Some general idea of the frequency of this affection may be obtained from the statistics of Schwartz, who gives the relative frequency of nervous to inflammatory earache as 1.8 per cent. The recognized clinical types are: *primary* or *idiopathic*, *reflex* or *referred*, and *secondary* or *herpetic*.

Idiopathic Form.—These primary cases are apparently quite rare, only a few observations are found scattered

through literature. The etiological factors mentioned in the recorded cases were as follows. Scarlet fever (Nottingham), malaria (Delcourt), influenza (Eitelberg), lead (Kretschmann), trauma (Szenes), and exposure to cold. A case of otalgia intermittens has been described by Eitelberg in the case of a man aged twenty, who for three months suffered from a periodical pain in the ear, coming on at ten o'clock every morning and lasting one hour. It responded promptly to quinine. A classical description of idiopathic otalgia was given by John Nottingham as early as 1857, under the title of *tic douloureux* of the ear, from which I quote as follows. "A very interesting case of neuralgia of the tympanum, or *tic douloureux* of the ear, has lately come under my notice in a young gentleman of ten years of age. The patient has a highly nervous temperament, sensitive and excitable, characterized by a fine cerebral development, and very superior intelligence. The painful affection of the right ear from which he now suffers followed an attack of scarlet fever which he had about seven months ago. Watching the case attentively, a few days since it was observed that a violent although momentary attack of pain occurred nearly every five minutes. Occasionally the interval was less, sometimes a little more; the pain is most lancinating and acute, causing the patient to jump up in his chair, and often to bound across the room, and to throw himself into the arms of his mother in the most frantic manner possible. As soon as the shock of pain is felt, a blush of redness displays itself upon the external ear, which gradually passes off before the next paroxysm occurs. The attack of pain is remarkably sudden, and its cessation is equally so, and it is particularly worthy of notice that the patient is in an instant completely freed from his agony, and at once resumes his previous occupation or amusement, as if no recollection continued of the writhing torture which has just passed off. This sudden attack, and as sudden arrest of

the pain, are very unlike any of the ordinary phenomena of otitis, and are not accompanied by the anatomical appearances or physical signs which characterize inflammatory affections of the ear."

Reflex Otalgia.

This is a very common affection, and generally accompanies and is dependent upon some gross lesion in the buccal cavity or naso-pharynx. Perhaps the most frequent cause is a carious molar tooth. Among the other numerous etiological factors of this reflex pain may be mentioned: periostitis, and deep-seated inflammatory affections of the teeth—especially the molars and wisdom teeth; tonsillitis, and other inflammatory and ulcerative affections of the throat; tumors and ulcerations of the tongue and epiglottis; retro-pharyngeal abscess. Affections of the articulations of the jaw also may give rise to otalgia, and Kretschmann in 84 cases found 20 of articular origin. In these cases, on the side of the lesion there is felt pain in the depths of the auditory canal. This may be aching or neuralgic in character, and is not infrequently exaggerated by making pressure on the diseased part. It disappears, often with great rapidity, after the removal of the local cause. Sometimes with the pain there is a feeling of fulness and discomfort in the ear. Gradenigo, in his studies, found that the reflected pain from otalgia was not centred in the depths of the ear, but was localized near the tragus, and occasionally in the auricle.

Double Reflex Otalgia has been observed by Wagenhauser (*A. f. O.*, vol. xxvii., p. 171) in ulcerative affections of the throat and epiglottis. A curious and, so far as I am aware, a unique case has been described by Delavan, of a persistent *crossed* reflex otalgia. In this case a right-sided otalgia of long duration was relieved by removing the diseased roots of a left lower molar tooth. It will be observed that the area giving rise to reflex otalgia is in the distribution of the second and third

divisions of the trifacial nerve. It will be remembered that both of these divisions stand in relation anatomically with the geniculate ganglion of the facial; this being affected through the medium of the great superficial petrosal nerve (which passes to Meckel's ganglion on the second division of the 5th) and the small superficial petrosal (which passes to the otic ganglion on the third division of the 5th). It is by these anatomical routes that the stimuli reach the geniculate ganglion and the pain is then referred to its peripheral representation. Examples of referred or reflex pain are to be found in many other nerve distributions, and I would particularly emphasize in this connection the occurrence of referred pain in diseases of the viscera. It seems to me very probable that in this form of otalgia we are dealing with a referred visceral pain, the focus of irritation being situated in the mouth or naso-pharynx in the trigeminal area, and the pain being reflected into the sensory area of the geniculate ganglion; the connections mentioned between the second and third divisions of the 5th, Meckel's, and the otic ganglia, and through these ganglia with the geniculate by way of the great and small petrosal nerves, serving as an anatomical basis.

Secondary Otalgia (Herpetic Otalgia).—As its name implies, these cases are secondary to an organic lesion of the nerve or its ganglion, and in the case of herpes oticus is dependent upon an herpetic inflammation (posterior poliomyelitis) of the geniculate ganglion. These pains, as in idiopathic or reflex otalgia, are referred to the depths of the ear, the canal, and the auricle. It must, however, be emphasized that more than one ganglion is frequently involved in zona, so that herpetic pains may also occur in the other nerve distributions of the auricle, and be dependent upon lesions in the Gasserian or 2d and 3d cervical ganglia.

Tabetic Otalgia.—As the 7th nerve is a mixed nerve in the sense of the 5th, 9th, and 10th cranial nerves, it would

only be natural to look for its involvement in cases of tabes dorsalis, especially in the cephalic or bulbar types of this affection. In the event of such a localization, one would expect lancinating pains in the depths of the auditory canal. The occurrence of lancinating pains in the ear is mentioned in the comprehensive studies of Topinard (*De l'ataxie locomotrice*), and by Pierret (*Essai sur des symptômes céphaliques du tabes dorsalis*).

I have, with this symptom in view, examined a large number of tabetics, and succeeded in finding three cases in which sharp shooting pains were felt in the depths of the auditory canal, having the same character as the lancinations in other distributions. In all these cases organic affections of the ear were excluded. These observations are only clinical, but it seems to me very probable that careful studies of the nerve of Wrisberg will show degenerative changes when this symptom is present. Of course, as the 9th, 10th, and 5th cranial nerves, as well as the auricular branches of the cervical plexus, are also concerned in the innervation of this area, ear pains may accompany degenerative changes in them as well, but sharply defined recurrent lancinations in the depths of the ear may very justly give rise to a suspicion of degenerations in the nerve of Wrisberg.

Reflex Aural Neuroses.—Under this heading are described in otological literature some peculiar symptoms, centred about the auditory mechanism and apparently of reflex origin. They are sensory, vaso-motor, and trophic in their nature. In one group the source of irritation is in the auditory mechanism, and the symptoms are projected into the trigeminal area. In the other the irritative focus is in the trigeminal distribution, and the symptoms are referred to the auditory mechanism.

I will not take up a discussion of these symptoms in detail, but will again emphasize the anatomical relations existing between the facial nerve and ganglion and the trifacial nerve and its ganglion, through the medium

of the great and small superficial petrosal nerves. I would, however, call especial attention to a relation which exists between the teeth and the sense of hearing. It is an old observation that loud and shrill sounds are accompanied by a sensation of pain or discomfort in the teeth; *vice versa*, there has also been noted (Hesse, Risien Russell, and Mummery) deafness accompanying affections of the teeth; the auditory disturbance disappearing promptly on removal of the diseased focus. Gruber observed also hyperacusis, which disappeared on removal of the affected teeth. Here is a very interesting connection between the function of hearing and the second and third divisions of the 5th nerve. It will be recalled that the geniculate ganglion has also filaments of communication with the acoustic nerve in the auditory canal, and the same path which conveys the referred pain in affections of the teeth may also carry stimuli inhibiting the functions of the auditory nerve.

REMARKS.

In the foregoing pages I have given a brief resumé of the literature of otalgia, its recognized clinical types, and the prevailing views regarding its origin and anatomical relations. Very briefly, too, I have touched upon the embryology and anatomy of the facial nerve and its close relation to the auditory mechanism. Although the mixed character of the facial nerve has been accepted by anatomists for a number of years, no definite sensory functions have been attached to its sensory mechanism. At the present time we have not a clear and definite conception of that peculiar localization of neuralgia termed otalgia. Because of the complexity and overlapping of the auditory innervation, certain mixed forms of otalgia must occur. These belong rather to the auriculo-temporal neuralgia of the trigeminus, or are occipito-cervical otalgias; not, however, otalgia in the pure sense of this term. The pure and more sharply

localized form of otalgia is, I believe, essentially a manifestation of the sensory system of the facial nerve.

It may be said that the glosso-pharyngeal nerve, which sends a tympanic branch to the tympanic plexus, may also be one of the underlying factors in otalgia. In answer, I would mention the other sensory branches of the 9th nerve: to the tonsil, to the palatal arch and pharynx, and the fact that this area is not involved in the pure forms of otalgia. Of course, I cannot deny that the sensory system of the glosso-pharyngeal nerve may be the seat of a neuralgic affection, either alone or in conjunction with that of the facial. In such an event, however, one would naturally look for the distribution of pain in the throat as well, and not in the ear alone. The vagus, on the other hand, has only a small cutaneous representation on the auricle, and could therefore hardly be brought within the realm of otalgia except in a secondary or subordinate sense.

From our knowledge of the anatomy of the sensory system of the facial, together with the distribution of the pains and herpes, in cases of inflammation of the geniculate ganglion, the circumscribed aural distribution of this nerve may be fairly well assumed. Its branches to the auditory nerve, the tympanic cavity, the tympanic membrane, auditory canal, and interior of the auricle, cover fairly well the pain area in the pure form of otalgia, whether primary, reflex, or herpetic. The relation of pure otalgia in the referred type to the sensory system of the facial is quite apparent from the communication of the geniculate with the second and third divisions of the fifth nerve.

I would say in conclusion that the central and peripheral connections of the 5th, 7th, 8th, 9th, and 10th nerves are so numerous and so intimate that many careful clinical analyses will be required before deciding the exact rôle played by any one of these nerves in the production of otalgia. It, however, seems to me clear that

while the facial nerve may be by no means the sole factor, it is the preponderating one in the production of otalgia.

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Illustrating Dr. Hunt's article on Otalgia

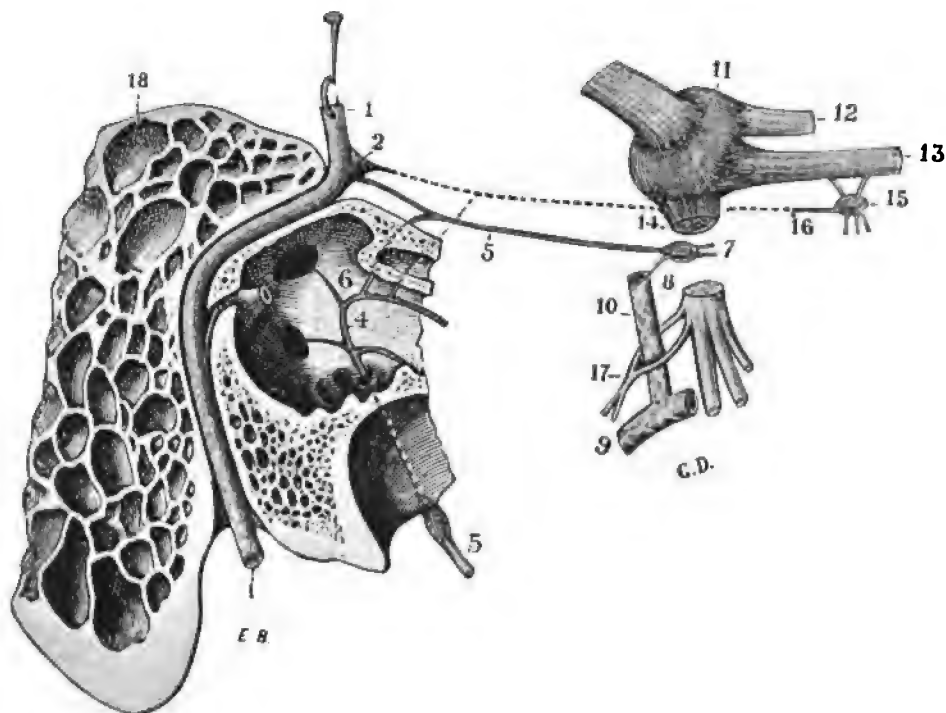


FIG. 1.—(*Testut's Anatomy.*) Showing relation of geniculate ganglion to Meckel's and the otic ganglia, and to the tympanic plexus.

- | | |
|--------------------------------|--|
| 1. Facial. | 9. Internal maxillary. |
| 2. Geniculate ganglion. | 10. Middle meningeal. |
| 3. Glosso-pharyngeal. | 11. Gasserian ganglion. |
| 4. Jacobson's nerve. | 12. Ophthalmic branch. |
| 5. Small superficial petrosal. | 13. Superior maxillary. |
| 6. Small deep petrosal. | 14. Inferior maxillary. |
| 7. Otic ganglion. | 15. Meckel's ganglion. |
| 8. Sympathetic ramus. | 16. Great superficial petrosal and great deep petrosal nerves. |

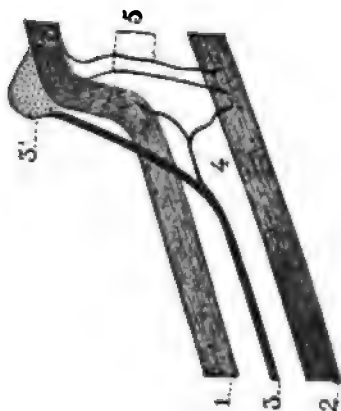


FIG. 2.—(*Testut.*) Showing anastomoses of the facial and auditory nerves.

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|---------------------------------|
| 1. Facial. |
| 2. Auditory. |
| 3. Pars intermedia of Wrisberg. |
| 4. Geniculate ganglion. |

ON DEAFNESS IN THE COURSE OF ACUTE OSTEOMYELITIS AND OF SEPTIC PRO- CESSES IN GENERAL.

BY PROF. SIEBENMANN, BASEL.

Translated from the German Edition, *Zeitschr. f. Ohrenhkl.*, Vol. LIV.,
1907, by Dr. ARNOLD KNAPP.

THE following authors have observed a case each of deafness as a consequence of acute osteomyelitis: Steinbrügge (*Pathological Anatomy of the Ear*, p. 116), Bezold (*Deafmutism Based on Aural Observations*, p. 99), Wagenhäuser (*Arch. f. Ohrenheilkunde*, vol. 46, p. 33), and Castex (*Arch. Internat. de Laryngologie*, etc. 1903, p. 1383, and *Report of the Fourteenth International Medical Congress*, 1903, "Causes of Deafmutism," p. 31). These four publications are practically limited to clinical observation. Owing to the great rarity of this remarkable disease, a description of three additional cases which I have observed during the last five years may be of interest.

CASE 1—A. H., aged twelve; 1903.

October 13, 1903.—The patient learned to speak at the proper time, developed mentally in a normal manner, also bodily, and enjoyed good health during her school years with the exception of a mild attack of measles. There were no evidences of hereditary syphilis. In May, 1897, the patient suffered from acute osteomyelitis of the left femur, and in November of that same year was discharged from the hospital with a suppurating fistula. In the spring of 1898 she

was again admitted to the hospital on account of recent pain and general swelling of the left thigh. On April 26, 1898, while the general condition was good and the hearing uninvolved, and without any preceding operation, the patient suddenly became deaf on both ears within four hours. This was not accompanied by any disturbance of sensorium or vertigo, vomiting, tinnitus, pain, or paralysis. A slight improvement occurred after a few months which has remained, so that the patient is now able to hear words and sentences spoken directly near the left ear.

The examination of October 14, 1903, showed excellent general condition; no syphilitic stigmata; bodily development corresponding to the age; no paralysis, no strabismus; normal gait. Pupils and eye-grounds are normal. The retronasal space is normal.

Ears: *Mt* quite normal.

Hearing $\left\{ \begin{array}{l} \text{right} = \text{ocm for conversation.} \\ \text{left} = \frac{1}{\infty} \text{ " " " "} \end{array} \right.$

On speaking loudly into the right ear the patient becomes giddy. The functional examination of the hearing shows that there is no perception for either forks or pipes, and that this ear is completely deaf. The left ear appreciates weighted forks from "*a*¹" up; pipe tones up to Galton-Edelmann 10.8 = *a*⁵ are perceived without any gaps. On rotation to the right as well as to the left, normal nystagmus is observed; the vertigo is more pronounced on turning to the left than to the right.

CASE 2—J. F., aged forty-three; 1906.

December 1, 1906.—When 25 years of age the patient suffered from acute articular rheumatism, but otherwise enjoyed good health. In January, 1901, with severe headache and high fever, he suffered from cryptogenetic staphylococcic septicæmia with multiple purulent foci, which appeared at first in the femur, then in both tibias, later in the foot, the left sterno-clavicular and sterno-costal cartilages, in one rib, etc., and these at the present day are not all healed. The patient was kept to his bed for three years and underwent operations from time to time. During the first month there

was a constant fever (38–40° C.), with pain in the forehead and neck but without any distinct meningeal symptoms. In May, 1901, after several attacks of marked subjective tinnitus, the left ear became deaf preceded by periods of fear; then suddenly the left ear became totally deaf with a report like the discharge of a pistol. In July a number of sequestra were cast loose and the fever gradually diminished. The tinnitus became less. In January, 1902, the patient was able to resume work. Beginning with March, 1902, he suffered from severe attacks of vertigo lasting from $\frac{1}{2}$ to 1 hour, without nausea, which were repeated at intervals of three to four weeks until February, 1904, then other osteomyelitic foci appeared in the foot, which were operated upon in October of the same year. From November, 1904, to December, 1905, there were repeated severe attacks of vertigo which recurred every two or three days and were made worse on motion. The pulsating subjective noises remained unchanged. In December, 1905, the headache and diarrhoea were increased, and the right ear, which had previously been normal, became suddenly deaf within a few days with marked subjective noises. At the same time intense vertigo and unstable gait set in so that the patient walked like a drunken person and could hardly support himself with the aid of a stick. In the summer of 1906 the gait and the hearing of the right ear improved and the noises diminished. The patient was then able to converse. The left ear remained deaf.

At present the gait is unsteady, especially in conditions of congestion following muscular effort or moderate indulgence in alcohol, and a sensation of rotation is experienced, with an appreciation of objects moving horizontally from right to left. This feeling of rotation is more marked at night. When the second ear became deaf, the patient was able to recognize persons on the street at distances of more than fifty metres only when he stood still. This was especially noticed when the patient's vision was turned to one side.

On *January 2, 1906*, Dr. Hug found the following: Right *Mt* slightly reddened; left normal. Hearing: right = 0.1 cm.; left, totally deaf. After catheterization the right improved to 5 cm.

Weber's test a¹ in the better ear.

$$\begin{array}{lcl}
 \text{Rinne } a^1 = & \left\{ \begin{array}{l} : + 10 \\ : - 0 \end{array} \right. \\
 \text{Lower tone limit} = & \left\{ \begin{array}{l} : \text{---} \\ : \text{---} \\ : \text{---} \end{array} \right.
 \end{array}$$

September 8, 1906, the condition is unchanged. The hearing is not improved by catheter. Two months ago, after the tinnitus of a pulsating character had existed for two or three weeks, and the deafness had increased but without pain, a muco-purulent otorrhœa set in on the right side, which has persisted. Examination showed no signs of either acquired or hereditary syphilis.

Examination *December 1, 1906*. A rather thin, large, somewhat pale man; can only walk distances more than 20 metres with the aid of a stick. Pupils, eye-grounds, pulse, and temperature normal. The trunk and extremities present 8 bony scars which are situated on the sternum, the ribs, tibia, and foot. On the left tibia there is a deep groove.

Left *Mt* normal. Right: Retroauricular region and canal are normal; there is no sign of any swelling or tenderness; the drum is pink, partly covered with macerated epithelium. At the posterior and upper extremities there is a teat-like red, perforated protuberance from which a tenacious, cloudy discharge escapes. No perforation murmur. Staphylococci are found in smears and in cultures.

Hearing: Both 0 for conversation; words spoken directly into the ear are not understood. Fork *a*¹ is not perceived from the vertex. Functional examination shows that the left ear is totally deaf. The right still possesses some hearing. The upper limit of the hearing scale reaches up to 4.5 of the Galton-Edelmann; the lower is *a*. There are no gaps. On examining the right ear the vowels *a*, *e*, *i*, *o*, *u*, also *T*, *P*, *R*, and *Sch* when spoken directly into the auricle are correctly understood. *Ö* and *Ü* are occasionally confused with *I*; *Z* and *S* uncertain; *M* and *N* as well as the soft gutturals and labials are not perceived. No Romberg. With eyes open the patient cannot stand on one leg, though with the eyes closed and feet close together he can jump forward and backward. The muscular power is symmetrical, normal. Patellar

reflex normal. Walking with closed eyes the length of a room is possible, but patient wavers if he has to walk greater distances even with the eyes open. On looking to the right, horizontal and rotary nystagmus set in which is increased on injecting cold water into the ear, but is unchanged when the water is warmed to 44° C. On looking to the left there are rapid, wavering nystagmic motions in the horizontal direction. Injections of cold as well as warm water into the right ear have no influence on the nystagmus. Turning to the right or to the left produces no vertigo and the nystagmic motions are but slightly influenced. On turning to the right with the head bent forward there is rotary disturbance without vertigo.

In the course of the following weeks after the perforation of the right *Mt* had been enlarged and the suppuration treated, hearing improved so that in the middle of December loud voices could be heard at the ear. On December 24th the suppuration had ceased and the hearing had increased to $\frac{1}{2}$ for whisper and 12cm for conversation. On December 28th whisper could be heard at 3cm. December 29th: Vertigo has disappeared; the patient can walk without his stick and can talk without the speaking-tube. The tinnitus on the right side is less pulsating and is not more marked than on the left. The right *Mt* is red but transparent. The posterior fold is poorly indicated; bulging has disappeared; the perforation opening has closed. Hearing on the right side for whisper 3 to 5cm. Fork a^1 can again be heard from the vertex. The lower tone limit has descended from a to a^1 ; upper tone limit is Galton-Edelmann, 6.5. The nystagmus has disappeared. The vestibular reaction to mechanic and thermic irritants is unchanged. The left ear remains totally deaf.

CASE 3.—B. B., 1902. Born 1876. Mother died of inflammation of the lungs when fifty-six years old; father is alive and is now in his seventieth year. The patient is the fifth of six children; four of these are alive and in good health; one died at the age of 1½ years from an unknown cause. There is no history of miscarriages or abortions. The patient has always been healthy and has never suffered from any trouble with his eyes. No gonorrhœa or syphilitic infection. In 1900

there were abscesses on both sides of the neck; this was recognized as peristruinitis. In November, 1900, the patient was taken actually ill with high fever and delirium. Two weeks later the right clavicle and the left thigh bone were swollen and the abscesses which developed were incised. Four weeks later the patient was able to return home. The wound in the thigh healed, but the suppuration in the neck and clavicle required re-admission to the hospital in January, 1901, when the abscess was opened and a few weeks later a sequestrum from the right clavicle was discharged. In March, tinnitus appeared on both sides, and in May, during the course of these suppurations the hearing rapidly diminished with severe subjective noises, constant vertigo, and vomiting, and in ten days the patient was completely deaf. During this time he also complained of disturbance of vision and was unable to read for three weeks. The wavering gait improved in October, 1901. The fistulæ then healed, though the scars over the clavicle would frequently break open. In December, 1901, the patient was able to return to work. The subjective noises were less but had not disappeared in March, 1907. The vertigo was experienced up to 1902, generally in the evening and then later disappeared. There never was any discharge from the ears; there never was any rheumatic pain or paralysis.

Examination in January, 1902, showed a well-built man with numerous scars on the neck following a purulent peristruinitis; the clavicle on the right side presented an adherent scar; there was a deep scar on the inner surface of the thigh. The skull and teeth were normal. There was no disturbance of sensibility or motility. Patellar reflexes were normal.

Examination of the eyes: Vision, left, 1.0; right, 0.7. In the right, extensive disseminated chorioiditis; left, the same localized to the equatorial region. The foci are too large for retinitis pigmentosa; this is also excluded from the presence of yellowish plaques over which the retinal vessels are seen to pass. Examination in 1907 showed the process to be quiescent.

Ears: Both *Mt* normal, with the exception of an opacity posteriorly. Patient is deaf in both ears for all tones. Examination of the vestibular function shows that on rotation

to the right and to the left, as well as after the injection of cold and warm water into the canal, there is no sensation of vertigo or nystagmus.

In this case the osteomyelitis seems to have been caused by the persisting strumitis. It is impossible to say whether the abscess in the thigh was superficial or secondary to inflammation of the bone. The disseminated chorioiditis was probably caused by the septic infection.

These seven cases furnish us with only a small material; we will, however, endeavor to show that there are many corresponding features, and that it is possible to develop a general clinical picture of an osteomyelitic deafness.

As regards the age of the different patients, it generally occurred in youth, in individuals during the process of growth (7, 7, 7, 15, 20, and 24 years); one patient belongs to middle age (40 years). This corresponds to the fact that acute osteomyelitis is more frequently observed in the first two decades than in later life. There is no particular predisposition of either sex, at the same time among these 7 there were 5 males and 2 females.

In all 7 there was an acute otitis beginning with high fever, which lasted many months and sometimes for years.

In 3 (Bezold, Siebenmann—Cases 2 and 3) there was multiple localization of the foci; in 4 there was only one bone involved, viz: the femur; in 2 the tibia, in 1 the humerus. This predilection of acute osteomyelitic processes to the long bones, and especially to those of the lower extremity, is in accordance with the experience of general surgeons.

As regards the affection of the ears it is noteworthy that in all the 7 cases the deafness was bilateral. The first signs of the deafness appeared always during the course of the bone suppuration, and in two cases (Steinbrügge, Wagenhäuser) during the first febrile period, not during the first days but during the first weeks of the bone disease. In three others (Bezold and Siebenmann—

Cases 1 and 3) a year intervened between the bone suppuration and the inflammation of the ears. Castex's patient became deaf during convalescence, three years after the beginning of the disease. While in these 6 patients the deafness appeared simultaneously in both ears, the course of our second case was quite unusual, viz: five months after the onset of the osteomyelitis in the febrile stage, one ear became affected; after $3\frac{1}{2}$ years, in an afebrile period, and after other osteomyelitic foci had appeared, the other ear was involved.

In the cases of Wagenhäuser and Bezold, an operation performed in narcosis seemed to have started the process in the ear; in the case of Steinbrügge meningeal disease seems to have been responsible, while in Castex's patient and in my three cases there was no particular inciting factor.

The progress of the loss of hearing is usually very rapid. In my three cases deafness occurred within a few hours or days in normal ears. In the other cases there was at first marked deafness which gradually became complete in three months in Wagenhäuser's case, and in two years in Steinbrügge's case. In Bezold's case complete deafness was observed 5 years later though the hearing, as in my cases Nos. 1 and 2, later improved. The final result of the process was total bilateral deafness in 4 cases; in the remaining 3 the deafness was complete on one side, while there were hearing remnants on the other— $\frac{1}{2}$ octave (Bezold), 4 octaves (Siebenmann—1) and 8 octaves (Siebenmann—2).

The two patients of Bezold and Castex who became deaf in their seventh year, later became deaf-mutes. This feature suggests the question whether osteomyelitis should not be regarded of etiological importance in deaf-mutism, and whether the few cases of this kind, with the exception of the two above, have not been incorrectly regarded as tuberculous, scrofulous, or syphilitic. This only can explain why in accurate and large statistics,

like those of Lemcke and Uchermann, not a single case of osteomyelitic deafmutism is recorded.

Subjective noises were observed in three (Wagenhäuser, Siebenmann—2 and 3). They appeared simultaneously with the onset of the deafness and persisted. In our second case the character was severe and pulsating.

Vertigo was observed as a persistent symptom of irritation or defect in those three cases where there were subjective noises. The former appeared somewhat earlier than the latter; in our third case there was an interval of 2 months, in Wagenhäuser's case 3 months; in our second case a year intervened. While in the last case the vertigo diminished, in Wagenhäuser's case and in my third case it later disappeared. A peculiar symptom was presented by my first patient inasmuch as the vertigo only appeared when the right ear was talked into. It is not possible to say whether tinnitus and vertigo did not appear in the cases of Steinbrügge, Bezold, and Castex. Our cases show that these symptoms may be absent, but in other cases may be so persistent and intense that they are associated with vomiting and continue for years.

The static function was examined in our three cases. This showed that the static sense was preserved in proportion to the auditory sense. When there were hearing remnants the reaction to the rotation-experiment was normal; in the third case, one of bilateral total deafness, the reaction to mechanical and thermic influences was absent. Our second patient showed the presence of simultaneous conditions of irritation and paralysis—a well-known symptom in other nerve lesions. On turning the eyes to one side, nystagmic motions spontaneously appeared. The vestibular and semicircular-canal reaction of the partially deaf ear was reduced for thermic and mechanic irritations, but was absent in the totally deaf ear.

In all 7 cases the middle ear escaped. In our second case, after 5 years there was an acute perforating purulent

otitis. The marked increase of the vertigo, the subjective noises, and the deafness during the existence of this suppuration make it probable that this was also a metastatic osteomyelitic process with involvement of the perilymphatic spaces, as the otitis began in a painless, torpid manner and staphylococci were found in pure culture in the middle ear. The endolymphatic cavity was generally only indirectly involved, because the hearing, after the middle-ear suppuration had ceased, returned to the normal.

As regards the nature and the anatomical site of this process in the ear, the history and the results of the functional examination in all the cases point to an infection of the internal ear. We know that a series of infectious diseases may cause an inflammation of the nerve and of the membranous labyrinth through the agency of the circulation. Both of these may have been effective in our cases. The osteomyelitis in none of these 7 cases invaded other nerves than those of the cochlea and vestibule. This, however, is not sufficient to rule out a polyneuritic infectious or post-infectious process, for it has been shown by others and ourselves that in tuberculosis and in typhoid, just as after the action of certain poisons like quinine and salicylic acid, the polyneuritic process may be localized to the auditory nerves. Other infectious diseases, like syphilis, may even invade the labyrinth or the nerve primarily.

As to the pathological changes and their origin, there is but one autopsy report and that was published by Steinbrügge. In this case the bone of both petrous pyramids was unusually sclerosed, the soft parts of the labyrinth were destroyed, and the lumina of both scalæ contracted or occluded, partly by connective tissue, partly by bony tissue originating in the endosteum. On one side the semicircular canals are contracted by deposits of bone and the membrane of the round window is ossified; the labyrinth nerves with their ganglia are

partly replaced by connective tissue. As Steinbrügge himself says that these changes are probably meningeal with reference to the previous history, and as in the 7 cases remnants of the vestibular or cochlear function could be demonstrated, it seems that further pathological examinations must be made in order to decide this question.

The possibility of the metastatic lodging of septic material in the labyrinth must be considered. This supposition is probably incorrect. Metastases in the inner organs are much less frequent in staphylococcus septicæmia than in the infection with streptococcus. In the majority, *i.e.* $\frac{4}{7}$ of our cases, there was only a single suppurating focus in the bony system, and aside from the case of meningitis of Steinbrügge, no internal organ was secondarily involved. It would be a very curious fact if the ear represented the only localization of metastases, and especially if these septic metastases should always occur on both sides and at the same time. In medical literature in general we have been unable to find examples of septic bilateral deafness. There are only two observations recorded; in both of these there was no bacteriological examination.

The one case was reported by Moos and this may possibly be among the cases of sepsis (Moos, *Wiener med. Wochenschrift*, 1863, p. 661): "Prof. Friedreich has drawn my attention to a case of sudden deafness from embolism of the basilar artery; in this case there existed during life an endocarditis." Another case was observed by Wendt ("A Possible Embolic Process in the Mucous Membrane of the Tympanum"—*Arch. f. Heilk.*, vol. xiv., p. 293):

A girl, twenty-three years old, died under pyæmic symptoms after the extirpation of a cystosarcoma of the left scapula. Five days before death she had suddenly lost the hearing of the right ear; during the last two days there has been no hearing on the left side. She was not able to understand

loud cries, nor was the watch perceived on application to the auricle or to the bones of the head. At autopsy abscesses were found in the lungs and spleen. The brain as well as the labyrinth, auditory and facial nerves, and the internal auditory artery are normal on both sides. There is nothing said about the microscopic examination of these parts. The tympanum contained a sero-mucoid fluid. The mucous membrane was universally swollen, pale; there are numerous hemorrhages to be found on the labyrinth wall near the windows and the mouth of the tube.

The author explained the clinical appearance by the occurrence of an embolism of the tympanic blood-vessels. This, according to the autopsy report cannot hold for the right ear, and is not probable in the case of the left ear. In the first place, a complete destruction of the auditory and of the labyrinth function occurred because the patient was entirely deaf and the perception through the bones of the head was interrupted. The macroscopically negative condition of the labyrinth is interesting, but does not change the diagnosis based upon the functional examination, and only shows that there was no purulent or hemorrhagic form of labyrinthitis, and that it is possible that primary changes occurred in the auditory nerve.

In my studies on the neuritis and polyneuritis of the auditory nerve in cancer cachexia and in tuberculosis, I have shown that this infection can be divided into three main groups similar to that of the clinicians—infectious, constitutional, and toxic, and that sepsis is of importance in the pathology of the auditory nerve. Prof. Kocher, who has had a large experience especially in osteomyelitis, tells me that as far as he can remember he has never observed deafness or severe paralysis of the other sensory nerves in osteomyelitis or in sepsis. Prof. Enderlen has said the same thing.

Neuritic and polyneuritic conditions appear to be very unusual in septic processes. Remak says in a compara-

tively small number of cases neuritic and polyneuritic symptoms followed long-continued suppurations; generally the suppurative process is situated in the skin or in the subcutaneous tissue after traumatism; more rarely after suppuration of the inner organs. All cases have one feature in common, that the polyneuritic symptoms occur weeks or months after the onset of the suppurating process and not always in the primarily affected limb. Most frequently the amyotrophic variety with severe emaciation and great prostration is observed. The prognosis is not unfavorable in most cases; the paralyses disappear, as opposed to the osteomyelitic deafness in which no improvement occurs. According to Kraus, after the study of a few cases of septic polyneuritis, the vagus, facial, abducens, and motor nerves of the tongue are the most frequently involved of the cranial nerves. It is not without interest that of the previously reported cases persons of middle age have been attacked, and that women are more frequently affected than men; both conditions, as we have seen, do not hold for the osteomyelitic deafness.

In our 7 cases of osteomyelitic deafness, only one was examined bacteriologically; this showed the presence of a pure staphylococcic infection. It is well known that in acute osteomyelitis of the long bones this bacteriological condition is the usual one. I have endeavored to search the literature for instances of disturbances of the nerves experimentally, by staphylococci or their toxins. According to Kolle and Wassermann, Sander has studied the action of the staphylococcus filtrate on the nervous system, and has found that in two rabbits dead from staphylococcus toxins, there were evidences of acute cell changes, less marked, however, than when the infection occurred with living toxins. Disturbances of the nerves through endotoxins, *i. e.*, poisons of dead staphylococcus cultures, are not known. In the injection of living staphylococci into the venous trunks, changes are found

in the axis-cylinders of the gray and white substances of the spinal cord, while the peripheral nerves remain intact. Dr. Sander found changes in the ganglion cells of the brain in the form of Nissl's acute cell disease, especially in the motor nuclear regions of the trunk of the brain.

The neuritic and polyneuritic diseases of the optic nerve can be grouped in a similar manner to those of the auditory nerve, as the same poisons, the same constitutional anomalies, and the same infectious diseases occur. As the ophthalmologists have extended their researches in this direction very much farther than the otologists, the study of the septic diseases of the eye in general seems of importance. Cases of osteomyelitic blindness and diseases of the eye following osteomyelitis are not spoken of in surgical or ophthalmological literature, while other septic processes are very frequently encountered in the etiology of eye diseases. "Hardly an organ," says Lenhartz, "is so frequently affected in septic processes as the eye." Hemorrhages have been observed in the eye-grounds in 30%, septic retinitis in 10%, panophthalmitis in 4 to 23%, though the latter has never been observed in staphylococcus sepsis; the infection is always due to streptococci and the patient is in advanced years. Rarely inflammation of the papilla was observed. Lenhartz has observed an optic neuritis in a chronic streptococcus endocarditis which proved fatal. This author described a case of cryptogenetic streptococcus sepsis with symptoms of acute polyneuritis of both lower extremities. Experienced ophthalmologists regard septic neuritis of the optic nerve as a very unusual disease. Uhthoff does not even mention this condition in the material which he has collected; Groenouw confirms this. After erysipelas, however, 2 or 3 cases of optic atrophy have been observed in which the indirect infection through the blood-circulation is assumed. Michel observed septic emboli in the optic nerve in two cases and Snell in one.

Just as unusual as a septic neuritis of the optic nerve seems to be, so frequent is panophthalmitis. Bilateral affection, according to the general consensus of opinion, occurs in $\frac{1}{3}$ of the cases, and generally both eyes are affected at about the same time. We may, therefore, assume the probability that in osteomyelitic deafness there is an inflammation first of the labyrinth and not of the nerve; at the same time, carrying the comparison between the eye and the ear still farther, the changes in the ear are represented by a more or less diffuse destruction of the labyrinth, more severe than the septic retinitis which occurs so frequently in the eye— $\frac{1}{3}$ to $\frac{2}{3}$ of all cases.

The fact that most patients who suffer from double-sided panophthalmitis following sepsis generally die, and only about 10 cases are known to have survived, may help to explain the rarity of osteomyelitic deafness, because those who are severely affected with osteomyelitis probably die, and the deafness is not recognized in the last days owing to the general condition of stupor. Moreover, of the patients in whom the ophthalmitis is the only metastasis only 25% die. It would seem well worth while, in the cases dead of staphylococcus sepsis, to carefully examine the labyrinth microscopically and bear in mind the possibility of a one-sided deafness through the septic process.

Our assumption that the labyrinthitis and not the neuritis is the cause of the osteomyelitic deafness is supported by the fact that both divisions of the labyrinth are involved to about the same degree. This is further confirmed by the autopsy report of Steinbrügge, and this is a much better explanation for the deafness than the meningitis.

The fact that in osteomyelitic deafness occasionally marked remnants of the auditory and the static function are found, suggests the condition of the labyrinth found in meningitic deafness. Moreover, the fact that during

the course of the osteomyelitic deafness no perforation from the labyrinth to the middle ear has been observed, agrees with the clinical and anatomical experiences which have been collected concerning the meningeal labyrinth suppuration. With the exception of Steinbrügge's case, meningeal symptoms were absent in our 7 cases of osteomyelitic deafness; for 2 of my 3 personal cases at least this seems absolutely true.

This condition resembles that form of deafness which is observed in hereditary syphilis much more than meningitic deafness. The two processes, however, are not identical. In my cases at least, the previous history and the general examination showed not the slightest ground for this supposition, and this is probably true for the other observers. The initial febrile period of the bone disease, with its typhoidal character lasting for days or weeks, is extremely characteristic, and the deafness follows osteomyelitis much more promptly than in hereditary syphilis.

Finally, it seems that the same destructive action which the streptococcus exerts in septic ophthalmia is furnished by the staphylococcus for the labyrinth. Pyogenic staphylococci, which generally form fewer metastases than pyogenic streptococci, seem to be particularly irritating for the ear, much more so than for the eye. It is impossible to say whether in these cases of labyrinthitis there was a new bacterial invasion. In the majority of cases of bilateral septic panophthalmitis there seems to have been a more direct toxic inundation than a toxic action. This seems probable because the deafness generally is bilateral and simultaneous and because the time at which the deafness occurred in half of the cases was long after the febrile stage had passed; in two, in fact, after years. On the other hand, these observations seem to confirm the opinion of the unusually long existing virulence of staphylococci and their toxins in the human body.

A FATAL CASE OF SINUS THROMBOSIS, AFTER
CHRONIC PURULENT OTITIS COMPLICATED
WITH CHOLESTEATOMA, ILLUSTRATING AN
UNUSUAL VARIETY OF INFECTION.

By ARNOLD KNAPP, M.D.

Previous History.—The patient, a boy of eight, suffers from kyphosis. There had been discharge from his right ear for three years. Severe headache and vomiting, which had existed for several months, were relieved by the extraction of polypi three weeks ago. The urgent advice of the surgeon to have the ear operated on was not followed. Three days ago the headache returned with great severity, and with vomiting; the discharge had ceased. There were three rigors yesterday and one to-day. The symptoms all pointed to a grave intracranial complication, and he was admitted to the New York Ophthalmic and Aural Institute on *February 1, 1906*.

On examination the right ear-canal was collapsed, the mastoid process tender, not swollen, the pain being marked below the mastoid tip and extending down the neck. Temperature 105° F. Pulse 140. Cerebration normal. Optic disks normal. Left ear normal.

Operation, February 1st.—On opening the mastoid cortex very fetid thin pus escaped from the dilated antral cavity which extended into the tympanum and contained broken-down cholesteatomatous masses. The inner end of the posterior bony wall was defective. There was caries in the attic and floor of the tympanum. There were no ossicles. The mastoid cortex was entirely removed. The underlying bone seemed soft, though there was no fistula. The sigmoid sulcus

was opened. The sigmoid sinus had retracted from the bone, and the cavity thus formed was filled with a serous fluid. The bony sulcus was then completely removed, backward beyond the knee and down toward the bulb, where the wall of the sinus seemed healthy. The sinus wall was soft and presented no granulations; it was of a yellow-black color. On making an incision into the sinus the parietal wall was unusually tough and thickened. The lumen contained a disintegrated clot, thin serous pus, and gas. The gas had the same odor as an appendicular abscess. After removing the clot the sinus collapsed. On following the clot posteriorly it became apparently normal, and its removal was followed by free hemorrhage. The inner wall of the sinus was normal. The clot near the bulb seemed healthy and was therefore left undisturbed.

On the following day the condition was fair, cerebation clear, the temperature rose to 103° .

On *February 3d* the temperature still remained at 103° . There was a slight chill in the morning. Some tenderness in the neck; the glands were swollen. The optic disk showed some congestion; the lungs seemed normal. It was decided to ligate the internal jugular vein, which was then done, together with removal of the enlarged cervical glands and the ligation of the facial and thyroid veins. On dissecting the vein upwards at the level of the hyoid bone it was found adherent and the wall inflamed, though it contained fluid blood. The mastoid wound was then rapidly inspected. It seemed to be perfectly clean except for some pus in the posterior part of the antrum directly internal to the sinus. This area of bone was removed. The bulb was then further exposed and the clot removed with a curette. The dome of the bulb seemed to be about an inch distant. There was some bleeding. The clot removed from the bulb was not disintegrated and of good color. On lifting the plug in the lateral sinus a gush of blood resulted. The wound in the neck was closed with adhesive straps.

On *February 4th*, the temperature was down to normal. In the evening it rose to 101° .

February 5th, on changing the dressing the dura internal to the sinus seemed purulent and discolored. On removing

the gauze from the jugular bulb, chocolate-colored pus, with some odor, escaped.

On the following day the temperature was 102°. There was considerable cough. The bulb seemed clean. The jugular vein was incised and slit up. The physical signs of a pneumonia increased. The temperature remained up, though the wound was perfectly clean. Respirations 50-60.

After four or five days of the same clinical picture with gradually increasing cyanosis, difficulty in breathing, and tracheal râles, death ensued.

After death the wound was inspected and the temporal bone, including the jugular bulb, removed. The jugular bulb contained a moderately discolored clot. The walls were apparently healthy. There was no meningitis.

The point of special interest in this case was the variety of infection found in the sigmoid sinus. Clinically and bacteriologically the infective agent belonged to the proteus-aërogenes group, a mixed infection characterized by the formation of gas. It is well known in general surgery that this combination constitutes the putrefactive form of infection which is extremely virulent. In sinus thrombosis secondary to mastoiditis it has chiefly been observed in chronic purulent otitis with cholesteatoma. Under these circumstances the jugular vein should have been ligated at the first operation. The septic pneumonia might then have had a favorable outcome, though the kyphosis was an unfortunate complication.

REPORT OF TWO FATAL CASES OF BRAIN ABSCESS.¹

By J. J. THOMSON, M.D., NEW YORK.

I HAVE taken the liberty of reporting the following cases of brain abscess on account of some points they presented illustrating the difficulty of accurate diagnosis at an early stage, and because one showed clearly the site and nature of the lesion, while the other gave practically no indication of the position of the pus accumulation.

CASE 1.—A sturdy young man eighteen years old, who with the exception of his ear trouble enjoyed remarkably good health. The family history was good, the parents both living and well.

About five years ago the patient was operated on for double mastoiditis. The healing of the wounds was rather protracted. During this convalescence his physician was taken ill, and he came under my observation. At that time the right ear did not show any tendency to heal, although about four months had elapsed since the original mastoid operation. A radical operation was performed and this ear gave no further trouble. The mastoid wound on the left side healed after treatment for six weeks or so. With the exception of an attack of furunculosis in the left canal, and repeated attacks of otorrhœa in the same ear, he had had no trouble until about March of the present year. He complained at that time for only one day of dizziness which entirely disappeared after

¹ Read at the meeting of the Otological Section, N. Y. Acad. of Med., Oct. 11, 1907.

a day in bed, and I did not hear any more of him until June 11th.

On that day he was seized with severe pain in the head, most marked on the left side and centring over the scar of the mastoid wound. He stated that two nights previously he had had a chill lasting several minutes, but felt sufficiently well to be about in the morning. There was a profuse discharge from the auditory canal, and the mastoid was quite sensitive to pressure. The temperature ranged from 99° to $99\frac{1}{2}^{\circ}$, and the pulse was about 90. The pain was the most marked feature at this time, and was distinctly more than is usually associated with an attack of mastoiditis, requiring full doses of morphine to control it. This condition continued without change until June 14th when a slight swelling appeared above the auricle, and the mastoid was more tender. Temperature 100° , pulse 110. A radical operation was performed on this day. The cavity of the previous operative field was filled with disintegrated granulations, covered with a shell of bone. The middle ear was also filled with granulation tissue, and the necrosis in the bone extended to the dura above the mastoid antrum. The dura was freely uncovered, but no indication of meningitis could be discovered. The lateral sinus was also uncovered, but did not present a pathological appearance. On account of these exposures, and the suspicious pain which existed before the operation, I decided to leave the posterior wound open, and defer the plastic operation until a later date. Immediately following the operation the head pain ceased, and the patient was very comfortable until on the fourth day he experienced a severe chill, with a rise in temperature to $104\frac{1}{2}^{\circ}$, the cause of which was soon apparent in a rash and cellulitis which involved not only the area of the wound but the entire face and scalp. This kept the temperature up for several days, but soon disappeared, and the patient did very well. At no time was there the slightest return of the pain in his head, and even during the time he had cellulitis he felt very well. At the end of about two weeks he went home. The wound granulated in a very satisfactory manner, and at the end of about ten days more he returned to the hospital for the plastic operation on the canal. Following this there was no eleva-

tion of temperature, or alteration of the pulse rate, and the young man felt as well as he ever did. At the end of a week he went home, and the same evening while playing cards was seized with a severe pain in the head, most severe over the frontal region. This was so severe that it would not yield to anything except large doses of morphine. The patient was returned to the hospital for observation. The temperature at this time was 99°, and the pulse 102, and he began to complain of photophobia. These with the slight temperature and headache were the only symptoms present.

On July 19th, two days later, the condition was very much the same. The temperature was 103½°, and the pulse 120. A careful examination failed to show another symptom. On July 20th no change was noted. There were no localizing symptoms, no Babinski sign, no rigidity of the neck or other muscles, reflexes were normal, no dizziness, nystagmus, or vomiting, and no ocular symptoms whatever. His mentality was not clouded in the least, and his co-ordination was apparently perfect as far as could be determined while he was in bed. The two predominating symptoms were still excruciating pain in the head and photophobia. The total leucocyte count was 6800, and the percentage of polymorphonuclear was 68. The urine showed nothing abnormal. There was no diazo reaction, and the Widal test was negative. His temperature on this day was 98°, and the pulse 90.

The case at this stage was very confusing to me, there being practically no symptoms of intracranial infection beyond the pain in the head, and this, taken in conjunction with a diminution of the leucocytes, and a normal temperature, and the pulse of 90, led me to look for some general invasion, possibly beginning with meningeal irritation or a serous meningitis.

On July 21st the patient passed the most restless day of his illness. He was mentally bright, showing not the slightest impairment of cerebration when in conversation. His pain was so severe, however, that he had to be closely watched in order to keep him from self-destruction by jumping out of the window. During the afternoon he was given 60 grs. bromide of soda, 20 grs. chloral, and ½ gr. morphine, and still his appeals for relief were pitiful. After midnight the patient slept for about five hours, and awoke feeling much relieved.

The leucocytes had increased to 7000 with a normal percentage of polymorphonuclears. He had had some retention of urine but voided without difficulty now, was free from all pain, and felt as well as he had at any time in the past six months. The temperature was $98\frac{1}{2}^{\circ}$ in the morning, and 100° in the evening. On the following day his condition had not changed. He felt so well that he desired to get up and read a book to pass the time, and said he would get weak if he remained longer in bed. He did not complain of dizziness when sitting in bed, and the photophobia as well as the pain in his head had entirely disappeared. He had a slight distress in the abdomen, and passed large quantities of gas, and the examination of the urine at this time showed a considerable amount of indican. During the night the headache and photophobia suddenly returned, and on the following day his condition was the same as it had been several days previously. The headache was confined for the most part to the frontal region.

The following day a thorough examination failed to detect a single localizing sign. His mentality was perfect, there was no aphasia of any type, no paralytic manifestations connected with the eyes, or palate, or tongue, or any of the muscles of the trunk, no disturbances of sensation, no optic neuritis, and no nystagmus could be elicited even on extreme abduction of the eyes. His temperature had gone up to 102° , and his pulse was now only 98, and blood pressure 140. Another blood count proved to be normal the same as the last one. An attempt was made to do lumbar puncture, but owing to the nervous condition of the patient it was necessary to abandon it. His condition became so bad, and his pulse so rapid and weak, that nothing could be done without a general anæsthetic, and it was not thought to be advisable to resort to that means. He began to complain of frequent chilly sensations, and in fact had done so occasionally before but did not have a distinct rigor at any time. His heart now was irregular. It would beat rapidly for 20 or 30 beats, and then slowly for as many, varying a great deal in its rate within the same minute. No change in the condition was apparent until July 29th, the eleventh day since the onset of his pain for the first time. On the morning of that day I thought his

speech was a little slow, showing a tendency to drawl, although his cerebation was active and not impaired in the least. He also for the first time said he felt dizzy. There was no retraction of the head, or tenderness, or rigidity about the neck, and with the exception of the changes already noted, and the fact that he was growing weaker, the condition was the same as on previous days. He was seen in consultation by Dr. John D. Richards that afternoon at 5 o'clock.

A very marked change had occurred since morning. The patient was drowsy for the first time, though quite rational when aroused; there was a slight tendency to lie with the head retracted; the neck muscles were rigid, only slightly, however, when an attempt was made to bend his head forward. No localizing symptoms were present. Neither Babinski's nor Kernig's sign could be elicited. The reflexes were normal, the intra- and extra-ocular muscles did not show any variation from normal, the tongue was protruded, and the palate elevated symmetrically; there was no paralysis of any of the muscles, or areas of anæsthesia, no aphasia, and the eye grounds were still clear. A blood count made during the day showed 15,000 leucocytes with 92% polymorphonuclears. It was plainly apparent now that the patient was suffering from increased intracranial pressure whatever the cause might be. A second attempt was made to do a lumbar puncture without general anæsthesia, but it was unsuccessful on account of our inability to hold the patient in a suitable position. An attempt under nitrous oxide was also a failure, so chloroform was used, and 10cc were withdrawn. The fluid came a drop at a time, and the first portion on account of being tinged with blood had a cloudy appearance, but a specimen obtained in a second tube was perfectly clear, and was sent to Dr. L. B. Goldhorn, from whom the following report was received.

Fluid perfectly clear. Centrifuged, showed a few endothelial cells, no pus, no blood, no bacteria. Cultures on bouillon, agar, and serum incubated 24 and 48 hours were negative. The original fluid incubated showed no growth, fibrin or clot, and remained clear. The patient died at 10.30 the same night.

On autopsy a large cerebellar abscess involving the

entire left lobe, a portion of the central lobe, and encroaching on the right lobe was found. Its walls were not distinct and did not show any capsule formation. From its size, and the history of the case, I am inclined to think it was the cause of the head pain at the time of the radical operation, the relief following this operation being due to the temporary relief of pressure afforded by the exposure of the dura and sinus.

CASE 2.—This patient was a man fifty years old, who had always enjoyed good health, had no specific history, or family history bearing on the case.

He consulted me January 15, 1907, on account of deafness in the left ear which he had first noticed two weeks previously. He complained of absolutely nothing else. He never had any pain or headache, or noticed anything peculiar until his attention was drawn to the fact that he was not hearing well. On examination the left canal was found to be symmetrically swollen, so that no view could be obtained of the membrana tympani or fundus of the canal. He said he never had any ear discharge, or trouble of any other character, and there was no discharge apparent at the time of my first examination. The swelling in the canal was not tender to pressure, and traction on the auricle did not cause any discomfort. There was no mastoid tenderness, or elevation of temperature, or increase in the pulse rate. There was no preauricular tenderness, or glandular swelling. An incision was made on the posterior wall of the canal, and also in the anterior wall. No pus was evacuated. The condition did not change for the next couple of weeks. The lumen of the canal remained the same, and there was no discharge from the ear. About Feb. 1st he began to complain of a dull pain on the left side of his head. This was not severe, and only troubled him at night. During the day he felt very comfortable and attended to his business, but found difficulty in sleeping at night. There was no increase in the temperature, no mastoid tenderness or tenderness in the canal. Percussion was negative. About Feb. 15th a slight swelling developed over the root of the zygoma, and this region was slightly

tender to pressure, but no amount of pressure on the mastoid would cause any pain, and there was still no discharge from the canal. After consultation it was decided to make an incision over the site of the swelling, believing that the condition was an external otitis. This incision evacuated about a drachm of pus. No fistula could be found leading into the bone, so after establishing a communication with the auditory canal, the wound was drained both into the canal and externally. It healed in a short time, and the pain on that side of the head was diminished, although not entirely relieved, and the canal remained occluded. The condition did not change for about a month. There was never any temperature or mastoid tenderness, no change in disposition or mentality, no discharge from the ear, and only on retiring did the patient complain of much discomfort.

On *March 16th* he presented himself with his mastoid and zygomatic region intensely swollen, red, and tender. That afternoon on opening the mastoid it was found to be entirely disintegrated, and filled with pus, which extended to the dura above the antrum, and also covered the sinus. Both these structures were heavily coated with granulations, and as there had been no symptoms of intracranial infection they were not disturbed.

The next day the patient showed a tendency to sleep a good deal, but was rational when aroused, the temperature was 99°, and the pulse 88. The blood count and urinalysis showed nothing abnormal.

March 18th.—Distinct aphasia was present. The patient was unable to say the name of any article shown to him. He designated everything by the same name, or rather by a meaningless sound, usually "tuh." He was perfectly familiar with the uses of objects, and only lacked the ability to name them. When shown an umbrella he said it was useful on that particular day, but could not call it by name, and was unable to write anything. With his eyes closed he could recognize objects placed in his hand, but could not call anything by name except money. He could tell the denominations of different coins without difficulty. He could carry on an intelligent conversation on any subject. There was no optic neuritis or muscular paralysis, and the reflexes were normal.

The intra- and extra-ocular muscles did not show anything. His pulse was 62.

March 20th.—His condition had become much worse. There was a slight facial paralysis on the right side, and also paresis of the right arm; the leg was not involved. There was beginning optic neuritis of the left eye, the speech was scanning, and replies to direct questions were slow. The blood pressure was 120*mm* during systole, and 105 during diastole. After consultation with Dr. J. A. Booth, Dr. E. G. Zabriskie, and Dr. W. C. Phillips it was decided to explore the temporo-sphenoidal lobe. After several unsuccessful punctures through the dural exposure in the mastoid wound, a small pus cavity was opened and about a drachm of pus evacuated. A rubber drainage tube was inserted and the wound dressed.

March 21st, the following day, the patient slept most of the time, but was rational when aroused. The pupils were widely dilated, and did not react to light or accommodation. The other symptoms remained the same.

March 22d.—Patient was considerably improved. The paralysis was not so marked in the face and arm. He was quite rational, not so drowsy, and discussed his case intelligently.

From this time on he gradually became more drowsy until complete coma occurred. The paralysis became more marked, as did also the optic neuritis, and he died March 27th. While dressing his wound on the day of his death, I made at least a dozen punctures in all directions in his temporo-sphenoidal lobe radiating from a point over the mastoid antrum, but failed to evacuate any pus from the abscess cavity that the autopsy showed to be present. On the day of his death his pulse fell to 58. The blood-pressure findings were taken by Dr. Lester M. Hubby, and on the various dates were as shown in the accompanying table.

	Temp.	Pulse.	Resp.	Systole.	Diastole.
March 19	98°	62	18	120 <i>mm</i>	105 <i>mm</i>
March 24	99.4°	88	20	112 "	90 "
March 25	99°	72	16	150 "	120 "
March 26	98.2	70	18	156 "	140 "
March 27	99.6	100	36	120 "	100 "

The autopsy made by Dr. Zabriskie showed an abscess cavity about the size of an English walnut situated about the middle of the temporo-sphenoidal lobe, and filled with thick creamy pus. This cavity was surrounded with the punctures which I had made prior to death, and although it could not be made out positively, it seemed that some of them must have punctured the cavity itself, but owing to the consistency of the pus failed to allow any to escape, notwithstanding the fact that in withdrawing the knife I made considerable downward pressure on the blade. As near as could be estimated from the walls of the cavity, the abscess had been in existence probably some months, and apparently did not communicate with the cavity emptied at the time of operation. The full report as submitted by Dr. Zabriskie is as follows:

Autopsy Report.—Autopsy performed 5 hours after death. Body well nourished. No external signs of violence. Rigor mortis well developed. Only examination of the brain was made. Large irregular incised wound behind the left ear extending upward and forward to one inch beyond the anterior border of the ear, which discloses the mastoid portion of the temporal bone entirely removed. On removing the brain, a large quantity of purulent fluid escaped. The dura is thickened and infiltrated and adherent to the brain surface in the region of the wound. Otherwise it is normal. The leptomeninges are thickened and infiltrated over the left temporal lobe, and extending downward toward the base of the brain. Everywhere congested and the vessels injected. Examination of the brain itself reveals a large abscess cavity the size of a small hen's egg which communicates with the exterior surface of the inferior temporal convolution about one and a half inches posterior to the tip of the temporal lobe. It runs backward and inward to within an inch of the lateral ventricle. The walls of the abscess cavity are thickened, show considerable connective-tissue proliferation, and round-cell infiltration. The surrounding tissue contains five or six easily discernible punctured wounds followed by capillary hemorrhages. The destruction of tissue being so great it is

impossible to determine how or in what manner the abscess was first formed.

The chief points of interest that these cases suggested to me were: the negative indications in the blood count in both cases; the difficulty of positive diagnosis in the first case; the relative value of puncture and exploration through the already existing mastoid wound in cases of suspected temporo-sphenoidal abscess, compared with that through a trephine opening over the superior or middle convolution; the fact that such a destructive lesion could exist in the cerebellum without giving more characteristic signs of trouble in that region.

ON THE PROGNOSIS OF THE OPERATIVE OPENING OF A PURULENT LABYRINTH.

By DR. R. FREYTAG, Breslau.

(Abridged Translation from *Zeitschr. f. Ohrenhilk.*, Vol. LI., 1906.)

HINSBERG in his article on labyrinth suppurations states that the opening of the labyrinth is an indicated procedure and that the results encourage further investigations. I have carefully reviewed the cases of operations on the labyrinth which have been published since that date, in order to see whether this view can be supported.

On pages 341-343 in the German original there is a complete list of 102 cases where (1) an operation was performed on the labyrinth with recovery; (2) with fatal termination from the labyrinth operation; (3) with fatal termination notwithstanding the labyrinth operation; (4) with fatal termination from a complication existing before the labyrinth operation; (5) with fatal termination from a disease independent of the labyrinth suppuration; (6) of opening of the healthy labyrinth; and (7) with unknown termination. I did not include in this review the simple removal of sequestra.

It is well to follow Hinsberg's example and to separate the successful from the fatal cases. The latter are then redivided into (1) those in which death was produced by the operation in the labyrinth; (2) those in which the labyrinth suppuration led to death notwithstanding opening of the labyrinth; (3) those in

which the cause of death was independent of the labyrinth suppuration; (4) those in which a fatal complication existed before the operation in the labyrinth.

Of interest are those operations where a diseased labyrinth was exposed. To determine the danger of the operation, we must take away from the 20 post-operative fatal cases the 17 belonging to groups (4) and (5) and 2 cases of group (3) must also be excluded; 70 cases remain. In only one of these was death presumably brought on by the opening of the labyrinth. That means a fatality of 1.4%, which is very much smaller than that found by Hinsberg.

The regular opening of a non-infected labyrinth seems to be relatively without danger; 9 operations of this kind have been performed on account of Ménière's symptoms or vertigo without purulent otitis, and in all cases recovery took place—in one case notwithstanding secondary infection of the operative cavity. Though there seems to be no particular reason to dread the operation, it is important to determine whether the prognosis of a labyrinth suppuration is aided thereby.

This question can only be solved if we compare in a uniform material the mortality of the cases where the labyrinth has been opened with those where it has not been exposed. I think my statistics enable us to judge of the mortality of cases where the labyrinth has been operated upon. With 67 recoveries there are 2 cases in which a fatal complication was not determined before operation where the complication developed after operation, and one fatal case following operation. That makes 3 fatal cases, a percentage of 4.5.

It is much more difficult to determine the mortality of cases of labyrinth suppuration where the middle ear only has been exposed. The statistics on this question suffer from one grave error—all cases of labyrinth suppuration are judged of equal importance, whether they are extensive or circumscribed, as for instance a suppuration localized to

one semicircular canal. In Jansen's material, where isolated diseases of the canal apparently prevailed, the mortality was slight, 10%, according to his reckoning; while Whitehead, whose cases were all severe, had a mortality of 35%. If we examine the yearly report of the Halle Clinic, we also find very high mortality. Of the 24 cases which Friedrich has collected for his monograph, 11 succumbed to the results of a labyrinth suppuration, in other words almost 50%.

A uniform material is furnished by the cases of labyrinth suppuration with the formation of sequestra which were first collected by Bezold and later by Gerber. These are all cases of extensive severe diseases, in which Gerber found a mortality of 16.6%. This problem can only be solved if in future in all reports cases of labyrinth suppuration are divided into diffuse and circumscribed forms. If we should regard the figures of Jansen we find a mortality of 10% for those cases which were not operated on in the labyrinth, with a mortality of 4.5% for those which were operated upon. This comparison, however, is incorrect, and should be very much more in favor of the operation, if it is remembered that in the operative cases the disease is always a severe one.

I have examined the cases which were observed in the Breslau Ear Clinic since the date of Hinsberg's publication. These make together 46 cases. Of 16 cases of labyrinthitis which were treated only by exposure of the middle ear, 6 were healed, 2 died from causes independent of the labyrinth suppuration, and in 4 the labyrinth disease caused death. This gives us a mortality of 22%. In 27 cases the labyrinth was opened at operation. Of these, 7 were complicated before operation by fatal conditions (6 with meningitis, 1 with brain abscess), and one died from chloroform. These 8 cases can be excluded in determining the mortality. Of the remaining 19 uncomplicated cases, none died—so

that the mortality of our uncomplicated cases of labyrinth operation is 0.

During the last years when we have regularly examined the functions of the patient before operation and at operation have carefully searched for defects in the labyrinth capsule, we have not encountered any fatalities among patients who did not present fatal complications before operation.

Realizing the small percentages of these cases, I think the following conclusions are justified:

1. Operation on the labyrinth brings very little additional danger to the patient.

2. The prognosis of labyrinth suppuration is improved by operative opening of the labyrinth.

The case-reports follow (see original).

DEAFNESS OF THE NEWBORN: A DISTURBANCE OF THE SOUND-CONDUCTING APPARATUS OF THE EAR.

By DR. W. KOELLREUTTER,

FIRST ASSISTANT IN THE ROSTOCK UNIVERSITY EAR CLINIC.

(Translated from the *Zeitschr. f. Ohrenhkl.*, Vol. LIII., No. 3, 1907.)

EIGHTY years ago Rudolphi recognized that the newborn did not react, or only to a slight degree, to sounds and noises. Subsequently all investigators have come to about the same results, but it has never been determined whether this deafness was due to a peculiar condition of the sound-conveying apparatus of the newborn or to the rudimentarily developed perceptive power of the sound-perceiving apparatus of the ear.

I have endeavored to approach this question by functional examination with the continuous tone series of Bezold-Edelmann in the newborn up to the age of 14 days.

First I should like to quote a few of the views which obtain in aural physiology in regard to this question.

I begin with a brief report of the development of our knowledge concerning the peculiar conditions found in the tympanum in the newborn.

In 1797 Herholdt found that the tympanum of the foetus contained mucus and amniotic fluid, the Eustachian tube serving as entrance. One year later Scheel found that the amniotic fluid was still present after birth.

He regarded this as a provision on the part of nature to dampen sound and thus prevent injury to the ear. Von Troeltsch, towards the end of the fifties in the last century, reported on the results of his histologic examinations of the tympanum in the newborn. He also found that the tympanum contains not only amniotic fluid and mucus, but also a mucous layer completely occluding the lumen of the middle-ear cavities. This mucoid layer could disappear before birth, and the hyperplastic mucous membrane may contract before birth, whereupon the amniotic fluid would take its place. This was later on confirmed by Moldenhauer, and proved to be the starting point of all those who have since investigated the cause of deafness in the newborn.

Preysing two years ago showed that this mucoid layer sometimes existed after birth and especially in the mastoid antrum or in the niches and holes of the tympanum, especially about the oval and round windows. This contradicted the view that the mucoid tissue always disappeared within the uterus, and that directly after birth, as soon as the amniotic fluid was replaced by air, normal conditions were present. Preysing was able to show in one case that seven months after birth myxomatous tissue was found in the submucosa of the tympanum. He concludes that the degree to which this mucoid tissue disappears at the time of birth is individually different, and that the retrogression under certain conditions may take place very slowly.

This has aided those who believe in the theory that the deafness of the newborn is entirely due to a middle-ear lesion. It seems difficult to understand why certain authors should regard the horizontal position of the drum membrane as responsible for the deafness, as the auditory canal permits the reflection of the sound waves in any position. The narrowness of the canal or the apposition of the walls cannot be regarded as regular obstructions to sound conduction.

The deafness of the newborn has also been examined functionally.

Kussmaul endeavored to obtain some information as to the hearing of the newborn, which he published in 1859, in his celebrated "Investigations on the Soul of Newborn Man." He says that "of all the senses that of hearing is the most asleep. It is possible to produce the loudest noise near the ears of the newborn during the first days without producing any reaction. I have attempted numerous experiments without any result. Dr. Feldbausch, Assistant in the Obstetrical Clinic, assures me, however, that unquestionably some of the sleeping children were seen to start in bed when somebody clapped his hands under the bed. This was observed in a child of three days. We, therefore, cannot say that the newborn does not have any auditory perceptions."

Though we cannot agree with these absolutely negative results of Kussmaul, the positive observations of Feldbausch do not seem to be conclusive, as concussion of the floor and of the bed by the clapping of the hands is not excluded.

Ranke in his *Principles of Human Physiology* says: "The loudest noise does not seem to make any particular impression on the newborn child. After a short time it begins to perceive the high tones. This seems to be due to a moderate sensitiveness of the auditory nerve. In the older child the highest and loudest tones are the most agreeable. Loud noises which are unpleasant to adults seem to be agreeable to the child." This theory of the lessened sensibility of the auditory nerves must in our present views be regarded as questionable, as perception of the highest tones usually indicates good conduction of the auditory nerves.

Genzmer in 1873 published his "Investigations on the Perception of the Senses in the Newborn," in which he says: "In order to determine the relative distinctness of hearing, I observed the greatest distance at which children

perceived the beating of a small bell by closing their eyelids." The bell was heard usually at a distance of 8-10 inches. He found that all children after the first or the second day were receptive for auditory impressions, and that an improvement in hearing occurred during the first weeks of life. He believes that the auditory sense is individually different in the various persons, but Preysing's investigations have shown that the difference in the hearing of the newborn may be so much more easily explained by the irregular extent and distribution of the myxomatous tissue in the tympanum, especially about the windows. Moreover in Genzmer's investigations the ages of the children are not given except in two cases, and it is also not stated whether they were examined in a waking or sleeping condition.

Moldenhauer has also investigated the functional condition of the newborn ear. He examined the hearing by air conduction by means of a toy. This showed that the children reacted on the first attempt. At the same time the amount of the reaction differed in the various individuals and even in the same person on different days and under different conditions. He found that after a longer period of experiment the child became more or less accustomed to the noise and further experiments were valueless. Children born at full term and premature children showed no difference in the amount of reaction. He was not able to find an increase of the sound perception, as Genzmer states—without, however, coming to any definite result. These observations also lose somewhat in value inasmuch as this toy alone was used as the source of sound, as, on account of its unpleasant harshness and loudness, it is questionable whether any distinct auditory impression was produced, or whether or not pain was experienced by the sensory fibres of the auditory nerve which Politzer believes to exist. This question is also suggested by Moldenhauer in his report.

In Preyer's recent work on *The Soul of the Child*,

the interesting examinations of this author are given. He has not made any systematic investigations, but has carefully studied his own child from day to day in order to obtain some information about its hearing. According to this author, every newborn child is to be regarded as deaf, because he was not able to convince himself until the first half of the fourth day that his child was no longer deaf. It is very difficult to determine exactly when the first sensation of sound is felt, because we have no sign of a perceived sound impression. He also believes that there are individual differences, partly hereditary and partly acquired, to explain variations in the hearing of the newborn, and that after prolonged experimentation the hearing can be improved, though transient diminution occasionally occurs. His experiment with the tuning-fork placed on the vertex of the skull is also of interest though incorrect.

The gynecologist, Lange, in his book on *The Physiology, Pathology, and Care of the Newborn*, writes that hearing in the newborn is difficult to examine. Contraction of the eyelids, the general drawing together, and the crying of children, as we notice after very loud noises, may be the reflexes to all forms of irritants. Moreover faint noises may be heard without causing any visible reaction. He believes that all children are receptive for auditory impressions after the first or the second day, and that only very severe auditory impressions cause any reaction during the early days in childhood.

Sachs (*Arch. f. Ohrenheilk.*, vol. xxxv.—“Observations on the Physiological Condition of the Hearing in the Newborn”) has examined the hearing of children shortly after birth. He has evolved the following theory: that newborn children only react to noises, not at all to tones, even if these are directly transmitted to the ear by a tube. As he accepted the theory which now to-day is contradicted, namely, that the perception of tones and noises takes place at different nerve terminal stations,

he decides that the cochlea in the newborn is not sufficiently sensitive to perceive tones; the semicircular canals have, however, progressed further in their development, so that they perceive noises. I have experimented by placing vibrating tuning-forks in various places on the skull, but never succeeded in producing the slightest reaction. I have examined children during sleep, during a waking condition, and while they were nursing. These children always perceived noises but never tones. The examination of older children showed that in general there was a slight reaction to tones, especially c^2 . The deep tones were never perceived. There seems to be a predilection for the high tones. In all children there was a distinct and strong reaction to noise. In an isolated case there was a weak reaction to tones and a distinctly better hearing or exclusive perception of the high tones. Some children gave only a reaction to noises and none to tones either by air or by bone conduction.

Gomperz, in his book on this subject, believes that the reaction of the newborn to noises is not so slight as is generally accepted. According to him the hearing power of nurslings develops very markedly from the second week of life. He found that ordinary sound impressions, as have been employed by Kussmaul and Feldbausch, caused contraction of the eyelids and quick convulsions of the facial muscles in nurslings of one day.

Our material consisted of 20 newborn children. They were all examined in a sleeping or a half-sleeping condition. The source of tone was the Bezold-Edelmann tone series, and the examinations were only made by air conduction. To compare our results with those of Moldenhauer, we also used the musical toy, the *cricri*. Of the tone series we made use of the following forks—subcontra C, c^2 and c^3 , and Galton's whistle c^6 . The tuning-forks were set in vibration so that no impression could be conveyed to the child either optically or by a

draught. The Galton whistle was approached to the ear without causing any current of air. The results were observed by three persons who were witnesses to the examinations. The room for examination was a quiet room. The children were repeatedly examined for several days and at different times of the day.

We find that:

1. The cricri produces in all the children a distinct reaction at all times, even a few hours after birth.
2. The tones c^6 of the Galton whistle produced a distinct reaction in:
 - (a) all children within the first 24 hours after birth.
 - (b) 74% of all the children between 2 and 4 days old.
3. The tuning-forks subcontra C, c^2 and c^3 never produced any reaction.

We therefore find a good reaction to high tones from birth, while deep and middle tones in the first days apparently were not perceived at all.

It is remarkable that the newborn infant who perceived a few hours after birth the tone of the Galton whistle, when the experiment was repeated on the following days remained absolutely quiet and without interest.

We have been able to show that all newborn children react to high tone c^6 on the first day of life, while the deep tones are not perceived. It seems, therefore, that there is no reason to doubt the power of irritation which the auditory nerve possesses in the early age of children. This irritability in the light of present knowledge is shown by this reaction to the high tone c^6 , while the insignificant reaction to the other deep tones points to a disturbance of the sound-perceiving apparatus for which there is a well-known anatomic foundation.

REPORT OF THE SIXTEENTH MEETING OF THE
GERMAN OTOLOGICAL SOCIETY AT BREMEN,
MAY 17 AND 18, 1907.

BY DR. J. HEGNER, HEIDELBERG.

Translated by Dr. PERCY FRIDENBERG, New York.

1. Dr. A. HARTMANN (Berlin): **Report of the committee on the examination of the ears of school children.** There should be a preliminary examination and otiatric tests for diminished hearing. The latter is to determine the degree of deafness, cause and nature of the affection, and the possibility of cure. About half the cases can be improved or cured by timely treatment. The hearing should be tested by arbitrary words whispered without accentuation while the other ear is closed by an assistant. The cases should be divided into high degrees, hearing the whisper at $\frac{1}{2}$ metre or less with the better ear, medium grades, $\frac{1}{2}$ -3 metres, and slight degrees, 3-8 metres.

In the *Discussion*: WANNER (Munich) referred to the importance of repeating the hearing tests and otiatric examination after infectious disease. SIEBENMANN (Basel) advises plugging the free ear with damp absorbent cotton in case assistance is lacking. The Society resolved to send copies of the report to the higher school boards of the German federal states.

2. KUEMMEL (Heidelberg): **Bacteriology of acute middle-ear inflammation.** Previous investigations, while numerous and extensive, were carried out under such varying conditions of material and method that no definite decision could be formed as to the relative frequency of the various pathogenic

organisms. In the Heidelberg hygienic institute, Suepflé had examined 200 cases of otitis. Besides 14 cases of sterile "transudate" and 13 of sterile secretion in the early stage of otitis accompanying acute infectious diseases, organisms were found in 144. About 66% of these cases were due to *streptococcus pyogenes*, 11% to the *streptococcus mucosus*, 6% to *pyogenes aureus* and *albus*. The findings in *pyocyanus* otitis were not decisive. A similar percentage may not hold good in other regions or at other times. The frequent mention of *streptococcus lanceolatus* as the specific cause of otitis may be due to the difficulty of distinguishing it with certainty from other forms of streptococci, especially as the *str. mucosus* was unknown to earlier investigators. Most cases of *lanceolatus* otitis occur in the first two decades, particularly in children up to ten; *str. pyogenes* being well represented in childhood also. Operation is never required in otitis due to *pyogenes aureus* and *albus*, and but rarely, and then generally in early childhood, in *lanceolatus* cases. In *streptococcus* otitis the probability of an operation being necessary is 1:3; with *streptococcus mucosus*, an even chance. *Staphylococcus* otitis tends to run a protracted course, and its complicating presence with other organisms may affect the progress of the case, although it is more probable that these germs are present as saprophytes only, and that the chronicity of the apparently mixed infection is to be attributed to factors as yet unknown.

The development of chronicity is certainly not a necessary result of the presence of staphylococci. A cyclical course of *lanceolatus* otitis, described by some writers, could be noted only in those cases in which the germ in question had also become localized in other parts of the organism. *Streptococcus mucosus* seems, as others have remarked, to have a special tendency to destruction of bone, which may not become manifest until later on, often after the otitis has run its course. This peculiarity was formerly attributed, erroneously, to the *str. lanceolatus*. Individual peculiarities of the patient, local as well as general, of which we now know little or nothing, have something to do with the course of otitis. One of these individualities is the nature of the connection between the epitympanum and the meso-tympanum.

A free communication offers better chances for healing of the otitis without surgical intervention. The difference in the course of the epitympanic and meso-tympanic variety of otitis is seen most clearly in cases due to *str. pyogenes*, as almost all the operative cases of this nature are of the epitympanic type. There is no definite pathological explanation for this peculiarity. Hæmatogenous infection has a greater tendency than the tubal infection to cause severe constitutional disturbances and to implicate the mastoid cells. Secondary otitis would appear to be caused at times without the direct agency of micro-organisms by toxins, healing rapidly unless infected by germs, in which case it runs the usual course.

3. DENKER (Erlangen): **Bacteriological examinations in acute middle-ear suppuration.** In 20 cases of acute mastoid empyema, the mastoid pus revealed at operation was carefully examined. *Streptococcus pyogenes* was found in 62%; *streptococcus mucosus*, in 13.8%; *staphylococcus pyogenes*, in 17%; indeterminate Gram-resistant diplococci, in 7%. *Diplococcus pneumoniae* was not found at all, although 9 cases occurred in children. The *staphylococcus pyogenes* was found twice as frequently as in the Heidelberg series, the results otherwise corresponding to those of Kuemmel. The latter found pneumococci, too, in over 18.5% of all cases examined, but in only 2 cases was this germ found in the mastoid pus. These two cases both died of meningitis, and streptococci were found in the lumbar puncture fluid and in pus from gland abscesses. This shows that the diplococcus of pneumonia is rarely the specific pathogenic microbe in acute empyema of the mastoid.

4. KOBRAK (Breslau): **Agents and paths of infection in acute otitis media.** The development in the middle ear of invading micro-organisms may be expressed clinically in a more or less marked general reaction, and bacteriologically in the condition of the blood. The latter presents positive data only in those cases in which well marked constitutional symptoms accompany the process in the middle ear. The specific germs are found in the blood in only a small fraction of the cases, characterized by a more or less markedly pyæmic course.

The germs are most apt to be found in the circulation in otitis due to streptococcus longus, rarely in mucosus, pneumococcus, or staphylococcus aureus otitis. Definite agglutination of germs cultivated from the aural secretion by the serum of the patient is seen in pneumococcus otitis, rarely in other forms, and seems to have some relation to the severity of the infection and to the cyclical course of the disease. Other serum reactions could not be shown. There was no definite correspondence between the virulence of the specific germ in animals and the severity of the infection in the patient. The cyclical course is generally due to pneumococcus; a more protracted and frequently pyæmic form, to the streptococcus longus; and an "interval" form, to the strept. mucosus. In this last form there is a free interval between the first attack of otitis and the later development of complications, as the infection tends to run its course either at once or in successive steps in the primary focus, while there is a latent process in the neighboring structures. Streptococcic bacteroæmia after acute otitis can be cured in about half the cases. In otogenic sepsis a decrease in the number of colonies in the blood and lessened hæmolysis do not by any means speak absolutely in favor of a recovery, but the opposite conditions are always ominous. The finding of streptococcus mucosus suggests careful watching of the patient for some time after the apparent cessation of the first attack of otitis.

5. NEUMANN (Vienna): **Bacteriology of acute middle-ear suppuration.** Infections with the typical diplococcus run the most rapid and mildest course. The nature of the infecting organism is not important for the development of complications in acute otitis, but the pneumatic structure of the mastoid process is a factor of moment. The course of the complications is, however, influenced, as capsulated cocci have a greater tendency than the non-capsulated variety to cause a spread of the process to neighboring territories.

6. WITTMACK (Greifswald): **Bacteriology of acute middle-ear inflammation.** Typical diplococcus cases run the mildest and most rapid course. Mastoiditis is much more frequent in infections due to the streptococcus mucosus, which tends to cause extradural abscess, and similar complications, even

when the middle-ear inflammation is mild. The finding of this germ is of clinical importance. Its capsule may be stained red with thionin, rendering culture tests unnecessary, and allowing a differentiation from lanceolatus and pyogenes.

Discussion of 2-6: SCHEIBE (Munich) is surprised that Kuemmel found no influenza bacilli. In former times the streptococcus pyogenes was infrequently found on opening the mastoid; now it seems to be found constantly.

SIEBENMANN (Basel) calls attention to the lack of a uniform criterion of bacteriologic data. There is little uniformity of methods, and in his experience the statistics vary greatly in different years, and even with different observers.

LEUTERT (Giessen): A positive finding of bacteria in the blood from the jugular, while absent from the blood from a vein in the arm, means disease of the sinus or bulb.

WINCKLER (Bremen): The streptococcus causes the severest types of infection. At certain times and in certain epidemics, *e. g.*, scarlatina, it is particularly frequent. In such infections with a marked tendency to general sepsis, streptococcic serum should be used energetically.

HOFFMANN (Dresden): has examined 30 cases of acute operative empyema of the mastoid. Streptococci were found in 10; staphylococci, in 9; diplococci, in 8, of which 7 showed Fraenkel's diplococcus; strepto- and staphylococci, in 1; 1 was undoubtedly, 1 probably, sterile; 23 cases were genuine, 7 secondary.

JOEL (Gerbersdorf) invariably found tubercle bacilli in the first stage of typical tuberculous otitis media. Later on, they were not to be detected.

DAHMER (Posen): thinks that time, opportunity, and locality determine the degree of special virulence. A case is reported in which lumbar puncture indicated serous meningitis, but later on the typical epidemic cerebro-spinal form became manifest.

KUEMMEL (Heidelberg): Streptococcus lanceolatus leads to complications requiring operation in only a minority of cases. Kobrak's material consisted only of very severe cases. Mucosus may at times be identified by the microscope, but generally cultures are required. Winckler's success with streptococcic serum is encouraging. Leutert's

observation may be a coincidence. It is quite possible that there may be bacilli in the circulation, and that they may be present, say in the vein of one arm, and only very sparsely in the other.

7. DENNERT (Berlin): **Acoustic physiological investigations of the organ of hearing.** Although it may be shown experimentally that sound reaches the labyrinth by three paths: the tympanic apparatus, the bone, especially the promontory, and the fenestra rotunda; the second is best adapted mechanically by nature, and plays the most important rôle. It is a question whether the molecular modus of vibration, according to Mueller, or that of "massive" vibration, of Ed. Weber, would be the more suitable. Dennert has found a definite standard of massive oscillations as affecting minute quantities of fluid, such as the contents of the labyrinth, by means of which the amplitude and intensity of oscillation may be judged. These data, with experiments on the effect of oscillations in fluid drops on resonators, and illumination of the apparatus in the ear, as well as clinical studies, show that "massive" actions of sound waves are accidental and secondary phenomena as far as audition is concerned, being eliminated by physiological structures when of the usual medium intensity, and causing injury to the apparatus when of great intensity. Molecular oscillations are the normal process.

8. SCHAEFER (Berlin): **New investigations of Helmholtz's hypothesis of resonance.** Certain secondary phenomena of tone have been cited in opposition to this theory. Schaefer shows that it explains all the secondary manifestations and hypothetical objections in regard to beats, interruptions, overtones, combination and variation tones, and so on.

9. WAGENER (Berlin): **Formation of crystals and giant cells in middle-ear suppuration.** Cholestearin crystals are often found in inspissated pus of mastoid suppuration which has healed without operation. Connective tissue with giant-cell production forms around this core, as a typical natural process of healing.

Discussion: SIEBENMANN: In chronic suppuration, particularly in cholesteatoma, small epidermic inclusions surrounded by giant cells are often seen. MANASSE observed a

similar process in a suppurating maxillary antrum cyst. BRIEGER has frequently found degenerated crystals in polyps of the ear.

10. MANASSE (Strassburg): **Demonstration of a case of congenital defect of the concha.** In this case there was complete absence of the external ear of the left side, with congenital deafness on both sides.

In the discussion KRETSCHMANN showed photographs of a case of developmental defect of the ear with facial paralysis.

11. DAHMER (Posen): **Dry treatment of acute and chronic perforative otitis media.** The author uses a tampon of gauze wound in a spiral around a beechwood peg, one end of which is covered with paraffin. The peg is withdrawn after the gauze strip is in place, and the accumulation of secretion is prevented by capillary drainage.

12. REICHEL (Bremen): **Report on 60 radical operations after Killian for accessory sinus suppuration.** The speaker laid stress on the importance of experience in the technique. Two cases died of meningitis. Of 50 cases collected, 34 had excellent, 14 passable, and 2 unsatisfactory, results as to headache and discharge. Diplopia was noted frequently at first, but as the technique improved this became rare. Paraffin injection to correct disfigurement was needed in 4 cases. A horizontal bone bridge, up to 1 cm in breadth, is made. After operation a bent glass drain is inserted, and the skin wound closed with Michel's clips. A small mouth mask is used for the narcosis.

Discussion: WINCKLER (Bremen) considers a universal or type operation unsuitable in a locality where there is such individual variation. He has devised an osteoplastic operation which does not extirpate the sinus, as the mucous membrane is not the source of danger, but rather the ethmoidal cells. The speaker demonstrated a patient whom he had operated upon for extensive necrosis of the antrum, both frontal sinuses, and upper and lower wall of the orbit.

KRETSCHMANN (Magdeburg) recommends narcosis after intubation according to Kuhn. Of late, he does not extirpate the sinus or remove the mucous membrane, but splits the exposed sac, packs it, and treats by the open method until healing has taken place.

HOFFMANN (Dresden) finds paraffin prosthesis very unreliable. In large and deep frontal sinuses he advises temporary resection of the anterior wall.

Voss (Koenigsberg) finds the Killian operation satisfactory even for very large sinuses.

NOLTBNIUS (Bremen) advises the formation of a broad horizontal bridge of bone. If the sinus is very small it can be curetted from below, or if large, also opened from above.

PANSE (Dresden) prefers narcosis through one nostril to intubation per os.

PASSOW (Berlin) speaks against the extra-nasal operation.

13. ROEPKE (Solingen): **Osteomyelitis of the frontal bone following sinus suppuration, and its intracranial complications.** But 13 cases of this sort have been recorded; 3 other cases were detailed. In one, a woman of twenty-three, the osteomyelitic focus was circumscribed by chiselling off the affected portion of the frontal bone. The patient died of frontal lobe abscess, which unfortunately was not opened by operation until the terminal stage, and probable rupture into the lateral ventricles. The abscess had developed before the operation on the bone, which had been infected by retention of pus in the sinus. In the second case, that of a student of twenty-three, with syphilis, infection of the abnormally thick diploë of the anterior sinus wall took place 5 weeks after removal of the anterior wall of the sinus. The affected frontal bone of the left side was chiselled away broadly to the margin of the hairy scalp. Death followed rupture of a *right* frontal-lobe abscess into the meninges and the lateral ventricles. The abscess was opened by operation on the evidence of left facial paralysis and of the extremities of the same side. The abscess had a dense capsule and could not be connected with the osteomyelitis focus which had been circumscribed by the operation. In the third case, the outcome was favorable, the osteomyelitis remaining limited to the anterior sinus wall of both sides which contained a thick diploëtic layer.

14. ESCHWEILER (Bonn): **Demonstration of specimens of mucous membrane in acute and chronic accessory sinus inflammation.**

15. BRIEGER (Breslau): **Pathology of otogenous pyæmia.** Parietal thrombi explain the cases in which large, obstructing

thrombi cannot be found in the sinus or bulb, but they cannot account for the development and continuance of general infection. Clinical data are valuable only when the thrombus is directly demonstrated, after Whiting-Meier, in the pinched off sinus. The thrombus must not only permit the entrance of bacteria into the general circulation, but actually keep up the general pyæmic infection. Even in cases of advanced and florid metastatic pyæmia, thrombi are found in such an advanced stage of organization that they can hardly supply the infectious material needed for a progressive general sepsis. There must be some direct importation of micro-organisms into the blood current. As in osteophlebitic pyæmia, we must bear in mind the possibility of bacteria multiplying and circulating in the blood, rather than a constant fresh supply from the original focus. In pyæmia complicating acute suppuration, there may be no thrombosis, or at least none sufficiently important of itself, as regards the pyæmia and metastases, to suggest an attack on the sinus without special indications.

16. NEUMANN (Vienna): **Instrument for opening the jugular bulb.** The speaker uses a Nelaton catheter armed with a Gigli wire saw. After opening the jugular vein the instrument is carried through into the sinus which has been exposed, or from above downward, and the outer bridge of bone of the jugular foramen sawed through from within outward.

17. RUDLOFF (Magdeburg): **Demonstration of an operation chair.**

18. HOFFMANN (Dresden) demonstrated **specimens of a brain abscess in course of healing**, and a stereoscopic view of an abscess with thickened capsule.

19. HEGENER (Heidelberg): **Demonstrations for the study of brain abscess.** (a) Solitary abscess of right motor cortical region, communicated from a sinus phlebitis by Trolard's vein (large anastomotic vein between the superior longitudinal and lateral sinuses.—P. H. F.). (b) Unoperated cerebellar abscess with sinus-phlebitis and labyrinthitis. Abscess and phlebitis probably developing by intermediation of the sacculus endolymphaticus. (c) Cerebellar abscess following labyrinthitis, probably due to toxic meningo-encephalitis. (d) Photographs of progressive suppuration of the cerebral

hemisphere, lasting $2\frac{1}{2}$ months in spite of wide opening of abscess, and finally causing death, not by meningitis, but by respiratory paralysis.

Discussion of 18-19: MANASSE (Strassburg) showed drawings of Hegener's case of transitory aphasia and agraphia, showing the thrombosed vein, and detailed a case of diagnosed right cerebellar abscess developing 8 months after evacuation of a left intradural abscess.

20. OPPIKOFER (Basel): **Rhinoscopic examination during menstruation, pregnancy, and delivery.** The speaker found, as did Freund and Zacharias, hyperæmia and slight hypertrophy of the mucous membrane of the nose in gravid women, but such changes are found in many other subjects and have no causal connection with pregnancy. No intumescence could be detected just before a labor pain, as claimed by Freund, nor was there any similar condition during menstruation. There was no marked tendency to hemorrhage and no increased sensibility in any case. A normal nasal mucosa does not become altered during any of the states mentioned in the title.

21. BARANY (Vienna): **Theory of nystagmus:** Only slow motions of the eyes are innervated from the vestibule, rapid oscillations originating in the supra-nuclear centre for fixation. Light narcosis inhibits rapid oscillations together with voluntary movements, while the slow form of nystagmus is not affected. In case of paralysis in the fixation centre, vestibular irritation causes slow motions, only, of the eyes, while nystagmus does not occur. This form could be called supra-nuclear ophthalmoplegia in contradistinction to the nuclear ophthalmoplegias, and to Wernicke's pseudo-ophthalmoplegia.

22. VOSS (Koenigsberg): **Radiography in otology,** recommends stereoscopic radiograms, made with Wheatstone's mirror stereoscope, and demonstrated a large number of photographs from anatomical specimens and from the living subject.

23. WASSERMANN (Munich): **Significance of the X-ray in diagnosis of affections of the antrum, and ethmoidal and frontal sinuses.** Radiographs make a differential diagnosis possible between affections of the ethmoidal and frontal sinuses. The rhinoscopic examination alone is very unsatisfactory. Positive findings are invariably confirmed by

the discovery of pus or of thickened mucous membranes on operation. The radiograms may also be used after operation and compared with later views, as a criterion of results.

24. WINCKLER (Bremen): **Radiographs of the mastoid process.** These pictures, taken from the front or the side, allow prognostically important conclusions to be drawn as to the thickness of the tegmen tympani, the pneumatic, spongy, or compact structure of the mastoid, and even show sequestra. Abscesses, particularly those of the temporal lobe, should be skiagraphed before operation.

25. HARTMANN (Berlin) demonstrated an **instrument case** and a **phantom for rhinological and bronchoscopic practice.**

26. SIEBENMANN (Basel): **On osteomyelitis deafness.** (Published in the German Edition, *Zeitschrift f. Ohrenh.*)

27. SIEBENMANN (Basel): **Demonstration of labyrinths of deaf-mutes.** Specimens and drawings of vestibule and cochlea of a deaf-mute with retinitis pigmentosa. This form is characterized by implication of the static apparatus, as correctly surmised by Bezold from the result of functional tests.

28. WITTMACK (Greifswald): **Injuries of the ear due to effect of noises.** (Published in *Zeitsch. f. Ohrenh.*)

29. ESCHWEILER (Bonn): **Demonstration of histopathology of the deaf-mute ear.**

30. PANSE (Dresden): **Interpretation of histological specimens in disease of the inner ear.** The following changes are undoubtedly morbid: In the bone: loss of the malleolus, resorption by osteoclasts, or apposition by osteoblasts, formation of bridges or filling up of pre-formed cavities with bone, connective tissue, blood, pus, exudate with fibrin, or bacteria. In the membranous labyrinth: colloid is a pathological product, but apparent changes in the form of membranes and cells must be interpreted guardedly. Displacement of the attachment of Reissner's membrane shows dilatation of the cochlear duct, but in changes of the papilla (p. spiralis; organ of Corti) putrefactive changes and artefacts can be excluded only if the nucleus and the cell boundaries are preserved. A diminution of cross-section of the nerves in the bony canals is proof of atrophy, but in the trunk of the

auditory nerve this may be caused by traction in removing the brain post mortem. The ganglion spirale often presents a diminution in the number of cells at the base as a sign of senile atrophy. Nerve staining is often indistinct on account of decomposition and acids.

31. Voss (Koenigsberg): **Pathogenesis of nystagmus in unilateral injury of the labyrinth.** A case is reported in which one labyrinth was not capable of stimulation. After injury to the other labyrinth, which had reacted normally, nystagmus toward the uninjured side developed.

32. BARANY (Vienna): **Clinical significance of relations of vestibular apparatus to cranial traumatism.** 40 cases were carefully examined, the character of the vertigo being determined in each instance, spontaneous, rhythmic nystagmus in extreme rotation being looked for. Only marked degrees in otherwise normal eyes are significant, as mild degrees are seen in health. Attacks of nystagmus with vertigo on stooping, or rapid motions of the head, are of practical importance. Identification of the spontaneous nystagmus by the production of an experimental nystagmus of similar character by means of the turn table is a valuable diagnostic aid. Antagonistic rotation of the eyes is frequent. The term of Ménière's disease or complex is no longer sufficient, as there are various forms.

33. NEUMANN (Vienna): **Circumscribed labyrinthine sup-puration.** Of this, as well as of the diffuse form, there are latent and manifest types. Presence or absence of spontaneous nystagmus, on looking toward the diseased or toward the sound side, sensibility of the vestibular apparatus, and the auditory function, and finally the local condition of the labyrinth wall found on opening the middle ear, will determine whether the simple radical with preservation of the inner ear is to be modified by opening of the labyrinth.

The following will be published in the *Transactions* of the German Otological Society:

34. STIMMEL (Leipzig): **Treatment of chronic otitis media by suction hyperæmia** (Bier). Simple compression of the cervical veins and suction hyperæmia were of little value in acute and subacute otitis, but the latter method, if persisted in, gives excellent results in chronic cases of not too long

standing, and, of course, without dangerous complications. Cessation of discharge and foetor and, in some cases, improvement of hearing were noted. The suction lasted at most fifteen minutes, were applied every second or third day, and repeated from five times, in favorable cases, to thirty-five times in the obstinate ones.

35. REINHARD (Cologne): **Case of gonococcus otitis.** Case of a child fourteen days old, with blennorrhoea of the eyes, and right otitis media. Gonococci were found in the pus from the ear. Dry treatment used without effect. Rapid recovery after irrigation with solutions of permanganate of potash, cleansing, and instillation of 1% protargol.

REPORT OF THE TRANSACTIONS OF THE SECTION ON OTOLOGY, NEW YORK ACADEMY OF MEDICINE.

MEETING OF OCTOBER 11, 1907. DR. WENDELL C. PHILLIPS,
CHAIRMAN.

Presentation of Cases.

CASE I.—Case of facial paralysis. TALBOT R. CHAMBERS, M. D.

Pearl L., aged seventeen, nervous temperament. Father died when she was ten years old. During the past two years she has had three severe falls on her head. One time she was picked up by her drunken brother and thrown into a box, sustaining injuries which lasted a long time. For three months afterward she could not turn her head without pain. Her mother was compelled to rub the left scapular region every night before she could go to sleep.

On September 28th she was exposed to rain, although she says she did not get wet. The next day facial paralysis set in, which was complete at first, but improved a little on the third day. There was an acid taste in the left side of the tongue, and she could not eat on the left side of the mouth. The left hand was cold. She says she has not perspired on the left side of her body for eight years, and has always been a mouth-breather.

Examination of ears shows both to be normal. Hearing for watch, whisper, and voice normal. Left bone conduction ten seconds longer than right. Hears highest Galton whistle and lowest tuning-fork. Fork placed upon top of head is heard equally in each ear. Faradism fails to elicit slightest

response from extrinsic muscles left eye and is very weak for buccal muscles. Left retinal veins enlarged without neuritis. Right retina normal. Vision $\frac{3}{8}$ in each eye. No contraction of visual field for white, red, or green, and there is no spasm of accommodation and fauces sensitive, thus throwing out hysteria. Nose has a large synechia between inferior turbinate and septum on the right side, and there is a large posterior spur of the septum on the left side pressing into the outer wall.

Dr. Chambers said that he hoped some of the members might be able to give him some suggestions in regard to the case. She seemed to be a case for the neurologist.

Discussion: Dr. JOHNSON said that it would not be wise to consider the question of operation until after the question of treatment had been carefully considered. He himself had seen at least two cases of facial paralysis coming on in this way from exposure to cold. The fact of her having received injuries at various times would indicate the possibility of the injury being at the bottom of the trouble. However, the patient is decidedly neurotic, and as the trouble has existed for only ten days it would seem that the best thing to do would be to send her to a neurologist and let him struggle with the high-frequency current or some form of galvanism.

CASE II.—Abnormal condition of ear, presenting the appearance of a radical operation. J. J. THOMSON, M.D.

This patient was recently seen by Dr. Thomson, giving a history of chronic suppuration as long as she can remember, after measles in childhood. Last May she had several polypi removed, since when the discharge has been less. Two weeks ago it ceased and she began to have a moderate degree of pain, which has also stopped. She gives no history of operation except the removal of polypi, but the ear presents the appearance of a complete radical operation. A probe can be passed far back into the mastoid, and the ear presents the typical appearance of a radical mastoid operation. She has never taken any anæsthetic, and declares she has never had any operation except the removal of polypi.

Discussion: Dr. PHILLIPS said that such cases were occasionally encountered. Some years ago he presented to the New York Otological Society a similar case which he described

as Nature's Radical Operation. In that instance, however, the posterior wall was not so much broken down as in this one. He had never before seen so complete an operation performed by nature.

In response to Dr. Thomson's request for suggestions as to what should be done in case the pain continues, Dr. Phillips said that this was usually an indication of intracranial complications, and he had seen some very serious results in cases where a discharge had continued for years and then suddenly ceased, followed by pain.

CASE III.—Neurotic girl with history of repeated operations upon the ears, but showing little indication of serious operative interference. W. H. HASKIN, M.D.

Discussion: Dr. JOHNSON said that it was sometimes surprising, in reopening a mastoid upon which a complete operation had been performed, to find an unexpected amount of bone tissue present.

Papers.

Report of a case of mastoiditis, followed by an interdural abscess which perforated at the parieto-occipital suture, producing an enormous abscess of scalp. By JOHN MCCOY, M.D.

This patient, Mr. A. B., age twenty-five years, single, Italian by birth, came into the clinic of Dr. John L. Adams at the N. Y. Eye and Ear Infirmary on Feb. 5, 1907. He gave the following history:

About three weeks previously he had pain in his left ear followed by a slight discharge of pus; this discharge continued, he thought, for about a week. He then noticed that there was pain on motion of the auricle, and tenderness and swelling back of the ear. This pain and swelling subsided on application of ice back of the ear. About one week prior to coming to the clinic he noticed a swelling taking place on the back of his head, and this swelling gradually increased in size. He said that he ate and slept fairly well during all of this period. The principal symptoms complained of on entrance to the hospital were deafness in the left ear and the swelling over the occiput.

Examination of the left ear showed no discharge in the

external canal; the posterior wall was œdematous around a small furuncle; the fundus contained moist secretion possibly from the middle ear. The membrana tympani cannot be completely inspected on account of the swollen condition of the canal; such as can be seen is covered with desquamating epithelium. The hearing is considerably diminished, the watch can be heard only on contact. There is no pain on pressure over the mastoid. Over the occiput there is a very large, soft, fluctuating swelling extending from the vertex almost to the neck. On admission to the hospital his temperature was 100.5° F. Pulse 106. He denied all history of syphilis.

At *operation*, Feb. 5, 1907, a crucial incision was made into the fluctuating mass over the occiput and a very large quantity of pus was evacuated. On probing the wound the probe was found to enter between two bony structures on the left side about three inches back of the ear. When the skull was exposed at this point it was found to be necrosed, and granulations were budding through from the dura at the parieto-occipital suture. The bone was removed around this area and an abscess cavity was found which extended forward to the mastoid region. The mastoid was then opened and the antrum was found filled with granulations, the internal plate was deficient over the sinus with granulations at this point, and the superior layer of cells was found necrotic. A direct communication existed between these necrotic cells and the abscess. The bone was then removed back to the parieto-occipital suture. The external layer of the abscess-sac was now removed, which seemed to be a portion of the dura. The wound was dressed and the patient made an uneventful recovery.

The pathogenic micro-organism found was the pneumococcus.

The case is interesting and unique from the fact that the patient exhibited so few symptoms with such an extensive involvement, and in the course which the interdural abscess took in escaping at the parieto-occipital suture.

Discussion: Dr. WALTON BROWNE (Belfast, Ireland) told of a case which had been referred to him, after having been treated for influenza, rheumatism, and septicæmia. He

found an abscess over the occipital bone, and upon opening this under the antrum and pressing it behind the pus could be observed. He simply cut down and cleaned out the abscess cavity.

Dr. ARNOLD KNAPP inquired concerning the exact location of the pus in Dr. McCoy's case, whether it was not extradural.

Dr. McCoy replied that it was not a case of extradural abscess. He did not know, however, whether to call it subdural or interdural—it seemed to be a splitting up of the membrane. The inner wall of the abscess was so thick that it seemed as though it might be a part of the dura itself.

Report of two cases of brain abscess. J. J. THOMSON, M.D.
(Published in full on pp. 576-585 of this issue.)

Discussion: Dr. PHILLIPS said that he saw the second case several times, and was present when Dr. Thomson opened the small abscess in the middle cerebral fossa. It was a most interesting case because of the fact that the man remained for so many weeks with an inflammation involving the intracranial tissues and mastoid without producing any symptoms. He was also familiar with the other case during its entire course, and it was surprising that a case of cerebellar abscess should give so few symptoms. All who saw it were surprised when the autopsy revealed a large cerebellar abscess.

Dr. DAVIS said that he had operated upon the first case himself four years ago. At that time all the mastoid cells and outer plate were removed on both sides. Dr. J. J. Thomson did a radical operation on the right ear, about three months later, because of continued discharge from that ear (Dr. Davis being confined to bed with typhoid fever at the time). The patient made a good recovery, and continued under Dr. Davis's observation for three years, being seen at intervals.

A short time after the radical operation on the right ear the patient injured the membrane lining the middle ear by falling on a stubble. The ear discharged for a number of weeks, but finally healed up entirely. During these three years, once in a while the patient would have some trouble in the left ear, but would go for months without any discharge. He had been a delicate boy all his life, but after the operations he improved, gained in flesh, and was more robust. He was

seventeen years old at the time of his death, and Dr. Davis was greatly surprised to hear of his death from the abscess.

Dr. DUEL inquired whether the lateral sinus on the left side was carefully examined at the time of the autopsy. It would be interesting to know if there was an obstructive sinus following the operation, which had subsequently infected the cerebellum.

Dr. CHAMBERS, referring to the remarkable absence of symptoms, said that he had had a patient, a man aged fifty-five, a locomotive engineer, who for a month had queer actions, ascribed to the change from a small locomotive to a large one. He would go in the street and play with the children as a grown man would not do, and acted irrationally but not enough so to take him from his work. He was suddenly taken sick and had a running ear. The doctor was sent for and his symptoms were found to be alarming. Within four hours after being called he did a radical operation, and was satisfied that everything was nice and clean. The patient, however, did not come out from the effects of the ether, but died in six hours. Autopsy revealed a quarter of an inch of purulent lymph extending all around the cerebrum—on both sides and in front,—without having given any symptoms at all.

Dr. PHILLIPS asked Dr. Hubby, who had made the examination for blood pressure, whether he had found anything peculiar or interesting in his investigations.

Dr. HUBBY replied that the most interesting point was the change of pressure. The blood pressure went up and down with the change of symptoms.

Dr. THOMSON said that one of the questions which he had hoped would be discussed was the advisability of trephining the skull. There was great difficulty in discovering any pus, notwithstanding the fact that when he felt sure the patient was about to die he had made punctures in all directions, backwards, forwards, and all around. He wondered whether it would have been better to have entered the skull and investigated the brain thoroughly through an opening directly over the external surface of the temporo-sphenoidal lobe.

Dr. PHILLIPS said that he did not think Dr. Thomson would have had any better success with the case if he had made an

independent trephine opening higher up in the skull. There was little doubt but that his knife had entered the abscess, but the pus was too thick to be evacuated in that way. He thought that the proper place to open an abscess was from the under surface, and not high up with the trephine opening.

Dr. DUEL said that many failures had been reported in cases of brain abscess, resulting in death a few days after the operation from meningitis. He thought that all who have to deal with such cases should read Ballance's last article on this subject and follow his technique. It is important that the abscess should be followed through the route of infection, especially if it comes from the ear. He believed that if the Ballance technique were more generally followed the reports in regard to brain abscess would be much improved.

Otalgia, considered as an affection of the sensory portion of the seventh nerve. J. RAMSAY HUNT, M.D. (Published in full in this issue.)

Discussion: Dr. BRYANT said that the members of the Section were much indebted to Dr. Hunt for the work he has done on the facial nerve, both for what he had shown to-night, and what he had done previously. He did not, however, agree entirely with Dr. Hunt in the matter of these unusual cases of otalgia which Dr. Hunt found reported in literature, and which he explains by the disturbed function of the sensory tract of the facial nerve. Dr. Bryant said that his own observation in a total of upward of 37,000 patients had been that otalgia without congestion was due to the fifth nerve. He had never seen a case that could not be explained by a lesion of the respiratory tract somewhere above the trachea. This had been proved by the removal of the cause, but he was sure that true neuralgia of the ear might exist, and it was well for us to have our attention called to it by Dr. Hunt.

Dr. HUNT replied that it is true most of the otalgias are of reflex origin, the focus of irritation being situated within the distribution of the second and third divisions of the fifth nerve. A small number of well observed cases have been recorded by competent otologists in which no irritation focus was demonstrable, and yet the affection was undoubtedly neuralgic in character. These must therefore be regarded as primary or idiopathic in origin, and according to his views referable to the sensory system of the facial nerve.

REPORT ON THE PROGRESS IN OTOTOLOGY DURING THE FOURTH QUARTER OF THE YEAR 1906.

BY PROF. ARTHUR HARTMANN, BERLIN.

Translated by Dr. ARNOLD KNAPP.

NOSE AND NASO-PHARYNX.

a.—GENERAL PATHOLOGY AND TREATMENT.

448. OPIKOFER. Contributions on the normal and pathological anatomy of the nose and antrum. *Arch. f. Laryngol.*, vol. xix., No. 1.
449. GOERKE, MAX. Observations on the pathological anatomy of the nose and accessory cavities. *Arch. f. Laryngol.*, vol. xix., No. 2.
450. KUBO. On the development of the so-called lobular hypertrophy of the nasal turbinals. *Arch. f. Laryngol.*, vol. xix., No. 2.
451. HOBBS, A. G. Priapism from nasal reflex: something for rhinologists. *Indiana Med. Jour.*, October, 1906.
452. RUCKER, J. B. A study of the nature of the micro-organisms found in the mouths and throats of healthy persons. *Univ. of Penna. Med. Jour.*, October, 1906.
453. HEATH, A. C. A simple contrivance for the relief of hay fever. *Jour. American Med. Assn.*, October 20, 1906.
454. PARK, W. H. and THRONE, B. Results of the use of refined diphtheria antitoxin: Gibson's globulin preparation in the treatment of diphtheria. *Am. Jour. Med. Sciences*, November, 1906.
455. GOODALE, J. L. Examination of the throat in chronic systemic affections. *Boston Med. and Surg. Jour.*, November 29, 1906.
456. BARDES, ALBERT. Syphilis of the nasal fossæ. *Med. Record*, November 10, 1906.
457. BUCKLEY, C. F. A method of operating on the lip. *Medical Record*, November 3, 1906.
458. WELTY, C. F. Acute and chronic suppuration of the ear and nose the direct cause of facial erysipelas. *Jour. Am. Med. Assn.*, December 22, 1906.
459. PERKINS, R. G. Relation of the bacillus mucosus capsulatus

group to rhinoscleroma and of the various members of the group to one another. *Jour. Infectious Diseases*, January, 1907.

460. MOSCHER, H. P. A speculum for submucous resection of the septum. *Laryngoscope*, January, 1907.

461. PENNINGTON, M. E. Virulence of diphtheria organisms in throats of well school children and diphtheria convalescents. *Jour. Infectious Diseases*, January, 1907.

462. KOLLE, F. S. A new operation for the correction of malformations about the nasal lobule. *N. Y. Med. Jour.*, January 12, 1907.

463. GRADLE, H. A method of graduated removal of the inferior nasal turbinal. *Chicago Med. Record*, February, 1907.

464. BROWN, ROBT. G. The relation of the tonsil to infection and infectious diseases. *Med. Record*, March 2, 1907.

465. BLACKWOOD, JR., J. D. Vincent's angina; with report of cases. *Am. Med.*, March, 1907.

466. KUYK, D. A. An operative method for the reduction of the inferior turbinate other than by cauterization or excision. *Jour. Amer. Med. Assn.*, March 2, 1907.

467. BALLIN, M. J. A case of rhinoscleroma treated with the X-ray. *N. Y. Med. Jour.*, March 16, 1907.

468. CARTER, W. W. Primary carcinoma of inferior turbinate. *Med. Record*, March 16, 1907.

469. THRASHER, A. B. Primary syphilis of lips and tonsils. *Lancet-Clinic*, March 23, 1907.

470. FANONI, ANTONIO. Observations on nasal and intra-nasal syphilis. *Post-graduate*, March, 1907.

471. VANCE, A. M. Technic of cleft palate operation and removal of silk sutures. *Surg. Gynecology and Obstetrics*, March, 1907.

472. RUPPERT, F. G. A new tonsillotome. *Laryngoscope*, March, 1907.

473. SIEBENMANN. Lupus pernio of the upper respiratory passages. *Arch. f. Laryngol.*, vol. xix., No. 2.

474. FEIN. On primary tuberculosis of the nasal mucous membrane. *Berlin. klin. Wochenschr.*, 1906, No. 48.

475. COHN. Old and new on nasal tuberculosis. *Arch. f. Laryngol.*, vol. xix., No. 3.

476. ESCAT. Epistaxis and purpura hemorrhagica. *Annales des mal. de l'or*, etc., February, 1907.

477. HAUSELMANN. On nasal tamponade. *Monatschr. f. Ohrenhkl.*, 1906, p. 658.

478. JÜRGENS. On the treatment of the nose in scarlet fever. *Russ. Monatsschr. f. Ohrenhkl.*, December, 1906.

448. OPIKOFER. Contributions on the normal and pathological anatomy of the nose and antrum.

The nose and accessory cavities of 200 bodies were examined

and the mucous membrane of the lower and middle turbinals subjected to microscopic examination. Two more important conclusions are the following: In 3% of the cases the sphenoidal cavities communicated; accessory sinus affections are more frequent in men than in women. In youth, notwithstanding the moderate development of the accessory cavities, inflammations are relatively frequent. There are cases of ozæna without any disease of the accessory cavities. Squamous and transitional epithelium are occasionally found in the lower and middle turbinals in noses not the seat of ozæna. The so-called intra-epithelial glands occur almost regularly in the normal nasal mucosa. VON EICKEN.

449. GOERKE. *Observations on the pathological anatomy of the nose and accessory cavities.*

The paper of Oppikofer just reviewed has led the author to say that: (1) He had previously drawn attention to the fact that in autopsies on decrepid individuals exudates are frequently found in the neighboring cavities of the nose which do not give any clinical symptoms; (2) he had been the first to draw attention to the presence of intra-epithelial glands in the nasal mucosa; (3) opposed to Oppikofer's view, intra-epithelial collections of leucocytes occur very frequently in the mucosa of the upper respiratory passages; (4) he had previously emphasized the manifold degenerative processes which take place on the epithelium of the nasal mucosa.

VON EICKEN.

450. KUBO. *On the development of the so-called lobular hypertrophy of the nasal turbinals.*

The papilli consist of capillaries, connective-tissue fibres, mucous cells, and round cells; they correspond to the adenoid layer of the turbinals in the adult. The glands empty regularly in the deepest parts of the tissues between the papilli; their ducts are sometimes cystically dilated; the lacunæ are reduced compared with normal turbinals; the connective-tissue fibres are increased. The hypertrophy of the elastic fibres occurs in proximity to the granular ducts. Histologically the lobular hypertrophy of the lower turbinals resembles most the polypoid formation of the middle turbinals.

VON EICKEN.

451. HOBBS, A. G. *Priapism from nasal reflex: something for rhinologists.*

Male, aged thirty-three, had heavy pain across the brow which increased during the day. The day following, in addition to these symptoms he had priapism which increased in severity for two days. Local application of adnephryn and cocaine to the swelling in the nose caused the symptoms to subside. Subsequently applications of the galvano-cautery to the hypertrophies in the lower turbinate have prevented a recurrence of the symptoms for more than a year.

CLEMENS.

452. RUCKER, J. B. *A study of the nature of the micro-organisms found in the mouths and throats of healthy persons.*

In all the throats examined by the author streptococci and diplococci were found, showing them to be the normal inhabitants of the normal mouth and throat. The streptococcus mucosus was found in 70% of all the cases. A typical pneumococcus occurred in 50%; typical pneumococcus was present in 25% of the cases examined. Organisms of the same species may behave differently in their action on starch if the organisms are from different sources. CLEMENS.

453. HEATH, A. C. *A simple contrivance for the relief of hay fever.*

The appliance consists of two rings, made of cork, hard rubber, or German silver, connected by a transverse band. Over the rings is stretched fine grass linen or chiffon. The rings are placed one in and across each nostril about one half inch from the external opening so that all air inspired must pass through this fabric. In cases where the appliance has been used relief was felt in from fifteen minutes to one hour.

CLEMENS.

454. PARK, W. H. and THRONE, B. *Results of the use of refined diphtheria antitoxin: Gibson's globulin preparation in the treatment of diphtheria.*

The results obtained in a series of one hundred cases show that the removal of a considerable portion of the non-antitoxic globulins, as well as the albumins from the serum by the Gibson method, has eliminated much deleterious matter from

the serum, so that local complications and constitutional disturbances are less likely to occur from its use. The globulin preparation has been used in several thousand cases of diphtheria without accident. CLEMENS.

455. GOODALE, J. L. *Examination of the throat in chronic systemic infections.*

Nine cases of cervical adenitis are reported which demonstrate that tuberculous cervical adenitis may exist in association with the presence of tubercle bacilli in the tonsils and is not necessarily affected by their removal; also that a form of cervical adenitis occurs, accompanied by distinct enlargement and subacute or chronic inflammation of the tonsils, which disappears after a tonsillotomy. CLEMENS.

456. BARDES, ALBERT. *Syphilis of the nasal fossæ.*

No attempt should be made to correct a deformity due to syphilis until the patient has been subjected to a course of medication covering a period of two years, otherwise the surgical procedure may excite irritation and ulceration. A nasal deformity can be greatly improved by subcutaneous injections of paraffin. Small injections at different sittings are advised. Artificial bridges and supports have been tried without success. A dental plate of hard rubber for a perforated palate gives the best satisfaction. CLEMENS.

457. BUCKLEY, C. F. *A method of operating on the lip.*

The method employed by the author for the removal from the lip of benign growths, or those that are malignant without glandular involvement, is described as follows: A pair of Murphy intestinal anastomosis clamps, with their blades sheathed in rubber tubing to protect the engaged skin and mucous membrane from the effects of their serrated surfaces, are applied as indicated in the diagram, with their edges about three-eighths of an inch from the line of proposed incision. The local anæsthetic is injected and the portion of the lip containing the growth is then excised. Sutures are inserted at the points shown and the edges of the wound are then approximated, the clamps removed, and the dressing applied. CLEMENS.

458. WELTY, CULLEN F. *Acute and chronic suppuration of the ear and nose the direct cause of facial erysipelas.*

The author assumes that there is sufficient evidence to state that erysipelas of the face is due to direct infection from a contaminated field of pure or mixed infections of streptococci; that the injection can be demonstrated in the majority of cases; that epidemics of erysipelas are nothing more than a direct wound infection through surgeons or nurses, and that the idiopathic erysipelas is a misnomer. He believes that the streptococci attain a more virulent form when one of the various cavities is infected.

CLEMENS.

459. PERKINS, R. G. *Relation of the bacillus mucosus capsulatus group to rhinoscleroma and of the various members of the group to one another.*

Among the conclusions reached in these experiments are, that the so-called rhinoscleroma bacillus has no etiological relation to the disease of rhinoscleroma but is rather a secondary invader. The organisms found in the nose and nasal growths in rhinoscleroma are different in different cases, although of the same general group.

CLEMENS.

460. MOSCHER, HARRIS P. *A speculum for submucous resection of the septum.*

The solid blades of Killian's speculum are modified by the substitution of blades made of wire. These fenestrated blades are adjustable so that any length may be used and they are sufficiently strong for the necessary work. At all times the condition can be seen through the wire blades without the necessity of withdrawing the speculum. The solid mouth of the speculum has a dull finish which removes the reflected light so tiresome to the eye.

CLEMENS.

461. PENNINGTON, M. E. *Virulence of diphtheria organisms in throats of well school children and diphtheria convalescents.*

It has been found that among well school children, approximately 10% have bacilli in their throats which correspond morphologically with the organisms of diphtheria. One half of these organisms were without effect on guinea-pigs. About 30% acted like attenuated forms and 14%

killed the animals with a fair degree of promptness. The organisms found in the throats of well persons who have not been exposed, are in the majority of cases without virulence; but these are sometimes responsible for a true diphtheritic infection. Organisms in the throats of well, exposed persons possess a marked degree of virulence and are responsible for more infections than the organisms from well, unexposed persons. The organisms from the throats of patients convalescing from diphtheria are very virulent, and may be disseminated as long as they remain in the throats, which period may far exceed the duration of the clinical evidences of the disease.

CLEMENS.

462. KOLLE, F. STRANGE. *A new operation for the correction of malformations about the nasal lobule.*

This operation applies particularly to the correction or reduction of an over-prominent nasal tip due to excessive growth or congenital malformation of that part of the nose, giving the organ an undue prominence and a hook-like appearance usually associated with a narrow, sharply upward inclined upper lip. The operation may also be used for the correction of hyperplasia nasi and rhinophyma. There is no disfigurement; complete recovery follows in five days.

CLEMENS.

463. GRADLE, H. *A method of graduated removal of the inferior nasal turbinal.*

Operating on the hypertrophied turbinal for enlarging the breathing space is performed where the condition is not favorable for a submucous resection or removal of a spine. It is also used in those cases where the turbinal does not obliterate or obstruct the breathing permanently, but through periodic turgescence the passage is temporarily occluded. It has never been found necessary to remove the entire turbinal, but it is well to resect a thin slice of bone to insure a permanent reduction of the cavernous tissue.

The device is a motor-driven trephine working within a guard. The essential part of the machine is the guard, a brass tube 8.5cm long with an internal diameter of 7mm. Twenty-five mm beyond the front end of the tube, one-half

of its circumference is cut off, leaving thus a semi-cylindrical shell.

CLEMENS.

464. BROWN, ROBERT C. *The relation of the tonsil to infection and infectious diseases.*

The author demonstrates how well the tonsil is arranged, from an anatomical standpoint, to resist infection. Inflammation of the tonsil is caused by a pathogenic germ trying to enter, and the inflammation itself is essentially a defensive reaction. When the resistance of the body is lowered from any cause, or the germs are virulent enough to overcome the other means of defence which the tonsil has in common with the rest of the oral mucous membranes, or if the tonsil is wounded, a positive chemotaxis having been produced, there is a lacunar tonsillitis. When a negative chemotaxis is produced, there is a general systemic infection without a tonsillitis. The relation of the tonsil to infection and infectious diseases is one of protection.

CLEMENS.

465. BLACKWOOD, JR., J. D. *Vincent's angina; with report of cases.*

Nine cases are here reported, occurring in children from two to ten years of age. Of this number, seven were of the superficial or mild diphtheroid type of Bruce, and two were from healthy children, smears from whose throats showed the presence of the bacillus fusiformis and in one instance associated with spirillum. The seat of the attack was on the lips, tongue, gums, cheek, tonsil, or pharynx, and in none was there marked destruction of tissue. No glandular enlargement occurred except that which existed prior to the disease. Attacks lasted from four to twenty-two days.

CLEMENS.

466. КУУК, D. A. *An operative method for the reduction of the inferior turbinate other than by cauterization or excision.*

The author reviews the many objections to the methods of cauterization and excision of the turbinates, and he offers the following suggestion as a satisfactory substitute: The operation consists in one or more incisions through the mucous membrane of the hypertrophic turbinate well down to the bone, when with a broad nasal saw the bone is cut to a depth

depending on its nature, whether cancellous or vitreous, which is easily detected by the sensation imparted to the hand. If the bone is dense and hypertrophied the cut is carried well down into its substance. The nostril is cleaned and the edge of the incised mucosa carefully tucked down into the cut which has been made with a wide saw to allow this. The tissues are kept in place by a carefully adjusted pledget of cotton saturated with equal parts of compound tincture of benzoin and flexible collodion. The dressing may be left *in situ* for several days, when, after careful soaking, it is removed without disturbing the tucked-in edges. Repacking is rarely necessary. The advantages claimed by this method are: Preservation of physiologically active tissues, freedom from disagreeable reaction or complications, absence of shock, freedom from aggravation of existent disease in related cavities, and ease and speed in its performance.

CLEMENS.

467. BALLIN, MILTON J. *A case of rhinoscleroma treated with the X-ray.*

The patient, female, aged fifty-three, first noticed nose and throat trouble sixteen years ago. She came under the writer's observation about one year ago, and on examination he found the larynx free from disease. The pharynx was one mass of cicatrices, destruction of the uvula, and the nose enlarged to double its normal proportions. The nasal passages were entirely occluded. The entire nose felt stony hard and appeared fixed. The X-ray treatment was employed three times a week, exposure lasting from three to four minutes, over a period of five months. No unpleasant effects followed except a slight dermatitis, which disappeared on suspending the treatment for a short time. At the end of the fifth month, the nose was reduced to almost its normal size, the redness disappeared, the tissues became softer and more pliable, and the outline of the nostrils again returned. The ulcerations dried up. It is stated that it is far better in these cases to give short exposures with high-frequency currents than long exposures with low-frequency.

CLEMENS.

468. CARTER, W. W. *Primary carcinoma of inferior turbinate.*

The case reported occurred in a woman thirty-eight years of age. The diagnosis was confirmed microscopically. The tumor was a typical columnar-celled epithelioma of five months' duration. The growth and all the surrounding tissues in the superior maxilla were removed, and at present, three months after the operation, there is no recurrence.

CLEMENS.

469. THRASHER, A. B. *Primary syphilis of lips and tonsils.*

These cases are reported to show that such affections are more common than is usually supposed. In two of the cases, the tonsil was the seat of the lesion, which produced no pain whatever, and in the other two the ulceration was situated on the lips.

CLEMENS.

470. FANONI, ANTONIO. *Observations on nasal and intra-nasal syphilis.*

The first case of the series reported was chancrous erosion of the tip of the nose; the second, the ulceration was confined to the right side of the nasal septum; the third had a thickened, dull red, semilunar patch on the left ala nasi, and the fourth a thickened incrustation of the inner aspect of the right ala nasi and all of the septum.

CLEMENS.

471. VANCE, A. M. *Technic of cleft-palate operation and removal of silk sutures.*

In order to avoid the stitch holes in these operations, silk-worm gut and a pair of ordinary aspirator needles of small size are used. Through one of the needles the gut is threaded double and in the other a single strand is placed. The needle with the double suture is passed first, the loop being pushed through it after the needle, and opposite this is placed the needle with the single thread. The single suture is engaged in the loop, and on withdrawing both needles the loop pulls the single suture through, leaving it in the proper position to be tied.

CLEMENS.

472. RUPPERT, F. C. *A new tonsillotome.*

The instrument consists of an under and upper blade with a

fork. The blades are curved so as to form about a right angle near the cutting part which is parallel to the handle.

CLEMENS.

473. SIEBENMANN. *Lupus pernio of the upper respiratory passages.*

This infrequent disease belongs to the tuberculous rather than to the pseudoleukæmic processes. The case observed showed from the beginning an involvement of the mucous membrane of the mouth, pharynx, larynx, and nose. The specimen removed for examination showed tubercle-like tissue with pronounced development of connective tissue but without caseation. Animal experimentation was negative. No reaction to tuberculin. An intercurrent erysipelas caused the entire process to disappear, but it returned after a certain interval. The paper is illustrated by pictures of the face showing the oedematous condition of the lids and the cheek. The changes in the mucous membrane are also described and two histological pictures given.

VON EICKEN.

474. FEIN. *On primary tuberculosis of the nasal mucous membrane.*

The patient was a woman twenty-five years of age without any other tuberculous disease. The anterior extremity of the right lower turbinal was the seat of tuberculous changes resembling lupus of the mucous membrane. The infection in this case is supposed to have occurred by way of the air current.

MÜLLER.

475. COHN. *Old and new on nasal tuberculosis.*

The author concludes as follows:

1. Tuberculous affections of the nasal cavity may be divided into: (a) Lupus: with or without lupus of the external nose with granulations particularly in the anterior parts, usually on the septum, though the turbinals and the nasal floor may be involved in otherwise healthy and young individuals. There is frequently an eczema of the vestibule and an anterior dry rhinitis. (b) Tuberculosis, generally in the form of ulceration with infiltration, tumors and granulation tissue; always secondary in markedly tuberculous individuals with possible tuberculosis of the lung.

2. External nasal lupus usually starts from the anterior angle of the introitus. Lupus situated thus can frequently only be detected by rhinoscopy.

3. Primary lupus of the nasal mucosa can remain isolated for months or years without any other tuberculous disease appearing.

VON EICKEN.

476. ESCAT. *Epistaxis and purpura hemorrhagica.*

The author has observed, in the course of two years, four patients suffering from epistaxis, where on closer general examination evidences of purpura hemorrhagica were present. The author urges in cases of habitual epistaxis, especially in children, that the skin and mucous membrane should be examined for hemorrhages.

BOENNINGHAUS.

477. HÄUSELMANN. *On nasal tamponade.*

To avoid nasal tamponade the author recommends using perhydrol (Merck). This may be applied by the patient himself. If the hemorrhage cannot be arrested by this means a small pellet of ferric-chloride gauze can be applied.

WITTMACK.

478. JÜRGENS. *On the treatment of the nose in scarlet fever.*

To remove pus from the naso-pharynx, the nose is to be irrigated with a small rubber bulb, using a solution of boric acid or salt solution, 2 to 3% solution peroxide, or, in severe cases of gangrenous angina, lime water or bichloride 1 to 5000. The solutions are to be warm.

SACHER.

b.—OZÆNA.

479. LERMOYEZ. The contagiousness of ozæna. *Berlin. klin. Wochenschr.*, 1906, No. 47.

480. BOTY. The injection of solid paraffin in ozæna. *Arch. internat. d'otol.*, etc., No. 3, 1906.

479. LERMOYEZ. *The contagiousness of ozæna.*

The author is a believer in the bacillary theory of ozæna. The paper contains clinical observations, reports on pathological examinations, and bacteriological discussions. Practically the author recommends that patients suffering from

ozæna should use protective measures as regards their surroundings and especially with reference to children.

MÜLLER.

480. BOTRY. *The injection of solid paraffin in ozæna.*

After describing a new form of syringe, the author states that he has treated 360 cases of ozæna with submucous injection of paraffin during the last four years. According to his statistics, 45% are curable; of the remaining, 20% can be improved to such an extent that the scabs and foetor disappear and the patient can dispense with the nasal douche. On an average, 20 injections are necessary for each patient; in one patient, however, with advanced ozæna, 100 injections were practised. After paraffin injections under the septal mucous membrane, in about 3% of the cases abscess appeared, but only then when at one sitting more than 0.5 solid paraffin was injected. The abscesses contained serous rather than purulent fluid.

OPPIKOFER.

C.—TUMORS OF THE NOSE.

481. JOHNSTON, R. H. *Sarcoma of the nasal fossa.* *Med. Record*, December 8, 1906.

482. RICHTER. *A new method of removing naso-pharyngeal fibroma.* *Monatsschr. f. Ohrenhkl.*, 1907, No. 2.

483. DELAMARE. *Contribution to the study of sarcoma of the nasal fossa.* *Thèse de Paris*, 1905.

484. ALTHOFF. *On endothelioma of the internal nose and of the neighboring cavities.* *Arch. f. Laryngol.*, vol. xix., No. 2.

485. PRAWOSSRED, N. *Carcinoma of the frontal sinus.* *Wratschebnaja Gaseta*, 1906, No. 13.

486. GERBER. *Osteomata of the frontal sinus.* *Arch. internat. d'otol.*, etc., vol. xxxiii., No. 1.

487. STEPINSKI. *Polypi of the choanæ in children.* *Arch. internat. d'otol.*, etc., vol. xxxiii., No. 1.

481. JOHNSTON, RICHARD H. *Sarcoma of the nasal fossa.*

Patient, female, aged sixty-five, had nasal obstruction and neuralgic pains on the same side of the face. There was a decided, hard, non-painful prominence of the nose externally which had been present for years. On looking into the nose a grayish-white mass, hard to the touch, could be seen above. Below, on a level with the inferior turbinate, was a pink growth, which bled easily. The nose was opened by an

incision in the naso-labial fold, the nasal bone was removed with cutting forceps. A hard, rounded mass revealed itself as a bony cyst of the middle turbinate which had no connection with the tumor proper. The fossa was filled with large masses of the growth, which was attached to the middle and inferior turbinates, the floor of the nose, and the walls of the antrum. The origin seemed to be from the antrum. The operation was only partially successful—a large mass was found extending into the naso-pharynx, all of which could not be removed. The examination of sections of the growth showed a very malignant, mixed-cell sarcoma. The patient died two months after from exhaustion. CLEMENS.

482. RICHTER. *A new method of removing naso-pharyngeal fibroma.*

The snare was first applied and tightly drawn around the base in order to constrict the blood-vessels; a second snare was then applied directly below the first, and after removing the guide it was used after the manner of a wire saw, so that the tumor was removed after ten minutes without the loss of any blood.

483. DELAMARE. *Contribution to the study of sarcoma of the nasal fossa.*

Twenty-seven cases of sarcoma of the nasal cavities have been collected by the author. The tumor occurs at every age of life. The course and prognosis depend upon the microscopic condition. The more connective tissue present in the growth, the more favorable the prognosis in general. Operative treatment can cure the condition. OPPIKOFER.

484. ALTHOFF. *On endothelioma of the internal nose and of the neighboring cavities.*

The structure of epithelioma is fully described and the points of differential diagnosis between this tumor and carcinoma and sarcoma given. Three cases are reported.

OPPIKOFER.

485. PRAWOSSRED. *Carcinoma of the frontal sinus.*

The patient presented a fistula below the left eyebrow and the eye protruded. A probe could be passed to the optic

foramen and into the frontal sinus. A frontal empyema was first diagnosed and Czerny's operation was attempted, but severe hemorrhage occurred and masses of carcinoma appeared. The anterior walls of both frontal sinuses and the upper wall of the left orbit were destroyed. The microscopic examination of the tumor showed carcinomatous pearls. Up to the present time only 3 cases of carcinoma have been described occurring in the frontal sinus. Of diagnostic importance is the fact that in empyema the probe comes in contact with carious bone, while in carcinoma it can be introduced to a great depth without any resistance.

SACHER.

486. GERBER. *Osteomata of the frontal sinus.*

Eighty-four osteomata of the frontal sinus were collected, also two personal observations with case histories are given. In general the author reaches the same conclusions as Hucklenbroich (Dissertation, Freiburg, 1905).

OPPIKOFER.

487. STEPINSKI. *Polypi of the choanæ in children.*

Stepinski reports 5 cases of polypi of the choanæ in children; 4 cases were microscopically examined, showing the tumor to be myxofibroma.

OPPIKOFER.

d.—DISEASES OF THE ACCESSORY SINUSES.

488. WELLS, W. A. The choice of operation in the treatment of maxillary sinus suppuration. *Laryngoscope*, December, 1906.

489. DARLING, S. T. The nasal accessory sinuses and pneumococcus infections. *Jour. Am. Med. Assn.*, November 10, 1906.

490. STUCKY, J. A. Mental symptoms due to disease of nasal accessory sinuses. *Med. Record*, November 24, 1906.

491. CRYER, M. R. Some variations in the frontal sinuses. *Jour. Amer. Med. Assn.*, January 26, 1907.

492. MERMOD. On chronic suppuration of the maxillary antrum. *Annales des mal. de l'or.*, etc., January, 1907.

493. HALLE. External and internal operations in suppuration of the accessory sinuses. *Berl. klin. Wochenschr.*, Nos. 42 and 43, 1906.

494. CORDES. On the preservation of the lower turbinal in the radical operation for chronic maxillary empyema, with formation of a nasal counter-opening. *Monats. f. Ohrenhkl.*, 1906, No. 11.

495. TEXIER. Caseating maxillary sinusitis: symptoms and diagnosis. *La presse oto-laryngologique Belge*, No. 2, 1907.

496. VAN DEN WILDENBERG. Osteomyelitis of the superior maxil-

lary and of the ethmoid bone, with empyema of the sinuses and of the orbit. *Arch. internat. d'otol.*, etc., No. 2, 1906, and *La presse otolaryngologique Belge*, 1906, No. 10.

497. ONODI. On the disturbances of vision and blindness caused by disease of the posterior ethmoid cells and of the sphenoid cavity. *Berl. klin. Wochenschr.*, 1906, No. 47.

498. SPRENGER. A case of cyst of the mucous membrane of the frontal sinus. *Arch. f. Laryngol.*, vol. xix., No. 1.

499. DELSAUX. Pseudo-frontal sinusitis due to a subperiosteal abscess of the forehead complicated with thrombophlebitis of the superior longitudinal sinus. *La presse otolaryngologique Belge*, 1906, No. 10.

488. WELLS, WALTER A. *The choice of operation in the treatment of maxillary sinus suppuration.*

The dental origin of many cases of maxillary sinus suppuration is admitted; but this must not be interpreted as justifying operation by the way of the alveolar process but only as demanding that the trouble with the teeth should be corrected. If the mere removal of a tooth makes an opening into the sinus, irrigation may be tentatively practised, not using any artificial appliance to maintain a permanent opening. But the alveolar operation should never be done as an operation of choice, because it establishes a communication between the mouth and a suppurating cavity, and requires the use of a tube or plug, which is disadvantageous. The open method of doing the canine operation is likewise to be condemned upon much the same grounds. When simple irrigation has failed, a large opening in the inferior meatus with removal of a portion of the inferior turbinate should be done. Few cases so operated on will require the employment of more radical methods. Those that do, however, should have the sinus well exposed through the anterior wall and curetted, after which the external opening should be closed, the communication made with the nose in the inferior meatus being utilized for drainage and subsequent treatment.

CLEMENS.

489. DARLING, SAMUEL T. *The nasal accessory sinuses and pneumococcus infections.*

It has been found that 92% of all pneumococcus infections coming to autopsy show a very marked degree of more or less

typical pneumococcus inflammation of the accessory nasal sinuses. Ninety-one per cent. of the lobar pneumonia cases show a sinusitis. All cases of acute pneumococcus meningitis presented an inflammation of one or more of the sinuses, and in every one the middle ears and mastoid cells were normal.

CLEMENS.

490. STUCKY, J. A. *Mental symptoms due to disease of nasal accessory sinuses.*

A series of eleven (11) cases are reported showing that acute or chronic disease of the nasal accessory sinuses frequently gives rise to serious forms of mental disturbance. The ethmoidal cells were extensively involved in all these cases. The mental symptoms were marked, and included insomnia, mental depression, indifference to conditions and surroundings, morbid suspicions, and suicidal inclination. Toxins, developed by fermentation and putrefaction in the gastro-intestinal tract, combined with the sepsis from pus absorption, the influence of which acts on the cortical cells and nerve fibres of the brain, are in all likelihood the causative factors in producing the mental disturbance.

CLEMENS.

491. CRYER, M. R. *Some variations in the frontal sinuses.*

The author illustrates and describes a number of variations in the frontal sinuses which include cases of multiple, unilateral, irregular, exaggerated, and absent frontal sinuses. He has found two cases in which the internal plate or wall was absent or incomplete, and in other cases the so-called ethmoid cells were pushed upward into the space of the frontal sinuses. He does not consider the variations described great exceptions, but believes if one thousand skulls were carefully examined equal variations would be found. And if the same number of diseased pneumatic sinuses were examined the variations would be found in greater proportion and more common. External evidence of these anomalies is generally wanting and examination through the nasal fossæ will give but slight information. Transillumination is usually unsatisfactory and clinical experience counts but little, as no two cases present like conditions. A good radiogram, if stereoscopic, is one of the most reliable means for disclosing

the character of the abnormality and disease in the frontal region.

CLEMENS.

492. MERMOD. *On chronic suppuration of the maxillary antrum.*

The author is an enthusiastic believer in the Caldwell-Luc method. In 141 cases there were 141 recoveries with an average of 2 weeks. A very remarkable record. The local anæsthesia with cocain adrenalin has greatly simplified the operation and should make its adoption more general.

BOENNINGHAUS.

493. HALLE. *External and internal operations in suppuration of the accessory sinuses.*

The author in general is in favor of the internal treatment of chronic empyema, with the formation of an opening into the nose and of an external opening or one into the mouth as far as possible. He objects to treatment which consists of irrigations, especially when the antrum is entered by-way of the alveolus. He recommends for the antrum of Highmore the formation of an opening as large as possible in the lower nasal tract with a bore and with preservation of the lower turbinal.

The internal operation on the frontal sinus consists in removing from the nose the underlying floor of the frontal sinus and a large part of the external table of the frontal bone, so that the instrument can be palpated externally through the skin and so that the opening into the nose is as large as the thinnest part of the root of the nose is from the internal table. Fourteen cases have been treated in this manner and the results have been satisfactory.

MÜLLER.

494. CORDES. *On the preservation of the lower turbinal in the radical operation for chronic maxillary empyema, with formation of a nasal counter-opening.*

The author urges the preservation of the lower turbinal in the radical operation for chronic empyema of the maxillary antrum. He has operated upon all the cases that required operation according to Denker's method except that the lower turbinal was not sacrificed, without observing any unfavorable effects on the subsequent course. The preservation of the lower turbinal is especially important in double-

sided affections. The loss of both or of the greater part of the lower turbinals produces unpleasant consequences and in addition to local changes in the throat and nose may cause permanent damage to the body. WITTMACK.

495. TEXIER. *Caseating maxillary sinusitis: symptoms and diagnosis.*

Fifteen cases of caseating maxillary sinusitis are reported and a severe and a mild form are described. The disease is a chronic one and attacks only adults, men and women. The onset is insidious. The mild form differs but little from the other suppurations of the maxillary antrum.

In the severe form the nose is occluded and there are fetid, caseating masses with pain and the formation of fistulæ. The swelling of the turbinals does not diminish on the application of cocaine. The turbinals appear like malignant tumors or like syphilitic formations. The puncture should be used for diagnosis. The prognosis is good. Irrigation of the cavity usually leads to recovery. Other interventions should not be tried until after two or three weeks if the irrigations have not been successful. BRANDT.

496. VAN DEN WILDENBERG. *Osteomyelitis of the superior maxillary and of the ethmoid bone with empyema of the sinuses and of the orbit.*

In a new-born child on the third day there was a red spot on the left lower and inner walls of the orbit. On the tenth day the eye protruded and there was discharge from the left nose. On the same side in the hard palate and in the canine fossa there was a fistula which also discharged pus. Syphilis uncertain.

At operation the cutaneous incision followed the inner side of the orbit, then the inner and lower orbital walls were exposed to the optic foramen. The purulent ethmoid bone contained numerous small sequestra. Finally the purulent maxillary antrum was opened from the nasal cavity. As the necrosis of the ethmoid bone is palpably due to congenital syphilis, calomel was prescribed in small doses. After several sequestra were cast off recovery took place. OPIKOFER.

497. ONODI. *On the disturbances of vision and blindness*

caused by disease of the posterior ethmoid cells and of the sphenoid cavity.

The various relationships of the ethmoid cells and sphenoid cavity to the optic canal and to the optic sulcus are described and illustrated with photographic pictures to substantiate the existence of a canalicular retrobulbar neuritis and optic atrophy of nasal origin.

MÜLLER.

498. SPRENGER. *A case of cyst of the mucous membrane of the frontal sinus.*

The author thinks this to be a mucocele originating from the frontal ethmoid cells, which had bulged forward into the normal frontal sinus.

VON EICKEN.

499. DELSAUX. *Pseudo-frontal sinusitis due to a subperiosteal abscess of the forehead complicated with thrombophlebitis of the superior longitudinal sinus.*

In this interesting case of thrombosis of the superior longitudinal sinus a suppurating subperiosteal abscess of the forehead was present and the nose was normal. The patient died. At autopsy there was purulent meningitis in the right frontal lobe, thrombosis of the superior longitudinal sinus, the left lateral sinus, and the jugular vein. The infection of the interior of the skull probably occurred by means of a vein perforating the frontal bone. It seems that thrombosis of the superior longitudinal sinus may take place without nasal infection. Epistaxis, which is regarded as pathognomonic for this thrombosis, may be absent. Owing to the direct connection between the superior longitudinal sinus and the left lateral sinus the infection usually follows this course. The longitudinal sinus can and must be treated surgically.

BRANDT.

e.—OTHER DISEASES OF THE NOSE.

500. MILLER, E. E. *Observations on an ideal local anæsthesia for submucous resection. Medical Record, February 23, 1907.*

501. COFFIN. *New operation for correction of the nasal septum. Boston Med. and Surg. Journ., January 17, 1907.*

502. HURD, LEE M. *The submucous resection of the nasal septum. Jour. Am. Med. Assn., January 12, 1907.*

503. SASSEDATELEW. *Habitual erysipelas of the nose and of the face. Russ. Monatschr. f. Ohrenhkl., January, 1907.*

504. FORCHHAMMER. The result of light treatment in lupus of the nose and of the mouth. *Hospitaltidende*, No. 8, 1907.

505. WOLFF-EISNER. Experiences with hay fever in 1906. *Deutsche med. Wochenschr.*, No. 7, 1907.

506. BAUMGARTEN. A tooth rhinolith in the nose. *Wiener med. Presse*, No. 1, 1907.

507. MANASSE. Cases of foreign bodies. *Arch. f. Laryngol.*, vol. xix., No. 2.

508. DAAE. Peculiar lesion of the brain secondary to the nose. *Arch. f. Laryngol.*, vol. xix., No. 2.

509. HERBER. Cosmetic operations on the nose. *Deutsche med. Wochenschrift*, No. 13, 1907.

500. MILLER, E. E. *Observations on an ideal local anæsthesia for submucous resection.*

The solution suggested is made by placing from 20 to 25 grains of cocaine crystals in a shallow dish and dropping on enough adrenalin chloride solution, 1:1000, to dissolve the crystals. The anæsthesia lasts about three-quarters of an hour.

CLEMENS.

501. COFFIN, R. A. *New operation for correction of the nasal septum.*

The operation is divided into two short sittings and is offered to meet the conditions unfavorable for prolonged surgical procedures. A more or less perpendicular incision is made anterior to the deviation, the posterior elevator is then introduced through the incision beneath the periosteum and perichondrium and worked backward, upward, and downward until these structures are free from the septum as far as the edges of the deviation. The space so made is injected with sterilized vaselin and the nose is allowed to heal. In a week the other side is operated on in the same way, only that the incision is made more anteriorly so as not to come directly opposite the first incision. The submucous spur is removed by a blunt knife and gouge. A small pledget of cotton is now introduced to hold the perichondrium and mucous membrane in the median line. Coffin believes that his operation is more likely to obtain true cartilage in the new system than in the usual window operation, because both cartilage cells and perichondrium are present between the first and second operations.

CLEMENS.

502. HURD, LEE M. *The submucous resection of the nasal septum.*

In seventy-five cases the youngest patient was ten years of age; the oldest was sixty-four years. The deflections occurred one-third oftener to the left than to the right. Only six gave a traumatic history. The author does not believe that the cartilage and bone regenerate. After a period of from one to two years, on examination the septum was found flaccid to the slightest touch of the probe. A microscopical examination of a small section removed from one case revealed only the two muco-perichondria with a small amount of fibrous tissue between them. Some new instruments designed by the author are illustrated. CLEMENS.

503. SASSEDATELEW. *Habitual erysipelas of the nose and of the face.*

After the consideration of two cases the author concludes that habitual erysipelas is not always a new infection, but that it remains in the body, usually in the glandular tissues, and from there it extends through the lymphatic vessels to the parts where the erysipelas occurs. SACHER.

504. FORCHHAMMER. *The result of light treatment in lupus of the nose and of the mouth.*

The pressure glasses of Lundsgaard are employed. By means of these glasses it is possible to apply the treatment 1 to 1½ cm farther up in the nasal cavity; in other words the parts which are the site of predilection of the lupus are made more accessible. In 47 cases 38, or 80%, gave favorable results. A number of cases of lupus of the mouth were treated with success. MÖLLER.

505. WOLFF-EISNER. *Experiences with hay fever in 1906.*

Owing to the early hot weather in 1906 the hay-fever period began two weeks earlier than usual, which meant that most of the patients had two weeks more of discomfort. The author does not agree with Dunbar, and believes that the pollen poison is not a toxin and that therefore pollantin is not an antitoxin, and that the etiological therapy can only be of value against susceptibility to pollen. The best means of preventing the entrance of pollen into the nose is the pro-

tective apparatus of Mohr modified by Schulz. The author believes that in rare cases the conjunctiva is also sensitive to pollen. These patients should wear glasses similar to the goggles of automobilists.

NOLTENIUS.

506. BAUMGARTEN. *A tooth rhinolith in the nose.*

A girl sixteen years of age had suffered from epistaxis from the left side of the nose for two years. On examination there was a hard prominence in the floor of the nose which proved to be a round milk tooth. The black rhinolith was the root of the tooth. At the same time the superior maxillary cavity of this side was obliterated.

WANNER.

507. MANASSE. *Cases of foreign bodies.*

Two cases of foreign bodies in the respiratory passages are described. The third case is that of a foreign body in the orbit which simulated a fracture of the lower wall of the frontal sinus. The patient, falling down-stairs, struck the right forehead against a bottle. There was a large wound at the eye, which healed in a short time. At the operation, one month later, the frontal sinus was intact, and 1 large and 8 small fragments of glass were found in the orbit.

VON EICKEN.

508. DAAE. *Peculiar lesion of the brain secondary to the nose.*

A short-sighted individual ran with great force with his nose against the point of an umbrella. The umbrella broke and the point was withdrawn from the nose. This was followed by hemorrhage and pain in the left half of the forehead. The left eye was blind. A few days later fever and signs of meningitis. Death on the twelfth day. At autopsy, in addition to meningitis there was a fracture of the frontal bone, the ethmoid bone, and the sphenoid bone. There was a hole in the meninges and perforation of the left frontal lobe into the left ventricle. Of interest is the slow course of the disease.

VON EICKEN.

509. HERBER. *Cosmetic operations on the nose.*

The operative treatment of the congenital and acquired anomalies of the nasal septum causing external deformity are

treated in this paper. Operations are usually performed subcutaneously with the aid of a knife, periosteal elevator, saw, and cutting forceps, under local anæsthesia. NOLTENIUS.

f.—NASO-PHARYNX.

510. SPRAGUE. *Observations in one thousand adenoid operations.* *Boston Med. and Surg. Jour.*, October 11, 1906.

511. JEHLE. *On the presence of the meningococcus and micrococcus catarrhalis in the naso-pharynx and attempts at disinfection with pyocyanase.* *Wiener klin. Wochenschrift*, No. 1, 1907.

512. KOBRAK. *Traumatic angina, acute exanthem, surgical scarlet fever.* *Arch. f. Laryngol.*, vol. xix., No. 2.

513. HASSLAUER. *A remarkable disease of the pharyngeal tonsil.* *Arch. f. Laryngol.*, vol. xix., No. 1.

510. SPRAGUE, F. R. *Observations in one thousand adenoid operations.*

Among these one thousand cases 503 were male and 497 were female with ages ranging from six months to thirty-seven years. In about 90% of the cases the adenoids were associated with hypertrophied tonsils to more or less degree. Investigation as to the cause of the trouble does not lead to satisfactory results. While the diseases of childhood undoubtedly help in the causation of this hyperplastic lymphoid condition the data are so incomplete and negative, and so many children have enormous growths who never had any of the exanthemata, that their importance in the etiology is not great. Sprague prefers ether anæsthesia in adenoid patients.

CLEMENS.

511. JEHLE. *On the presence of the meningococcus and micrococcus catarrhalis in the naso-pharynx and attempts at disinfection with pyocyanase.*

A relatively small quantity of undiluted or diluted pyocyanase suffices to prevent the growth of the meningococcus. The action is less marked on the cellular fluid obtained by lumbar puncture. For examination it is necessary to obtain the specimen from the naso-pharynx or from the posterior pharyngeal wall, because these infectious organisms are not to be found in the anterior parts of the nose. The amount of pyocyanase applied to the naso-pharynx varied between 0.5 and 3cm.

In the case of the micrococcus catarrhalis the instillation of pyocyanase in all children except one was followed by the absence of these micrococci. The meningococcus also rapidly disappears from the discharge of the naso-pharynx, usually after one or two applications.

According to the author, the meningococcus, at least in the healthy intermediate person, is only to be found in the masses of mucus and not in the mucous membrane. The action of pyocyanase was very slight or absent in the case of the streptococcus, staphylococcus, pneumococcus, and bacterium coli.

WANNER.

512. KOBRAK. *Traumatic angina, acute exanthem, surgical scarlet fever.*

To answer the question why removal of the pharyngeal tonsil is occasionally followed by fever and wound infection a number of bacteriological examinations and animal experiments were attempted. These show that the number of germs and the virulence of the discharge from the naso-pharynx is generally greater before the operation than after. The field of operation is usually poor in organisms; it is in a protected position, the admission of air and the passage of secretion is unhindered. It seems, therefore, that unusually severe conditions of a foreign infection must be present. He recommends that the operation should not be undertaken when there is a more or less purulent nasal discharge unless an antiseptic treatment has been carried out for a certain length of time, and it is not wise to remove the pharyngeal tonsil during epidemics of scarlet fever or other epidemics of acute infectious disease.

VON EICKEN.

513. HASSLAUER. *A remarkable disease of the pharyngeal tonsil.*

A case of herpes of the pharyngeal tonsil associated with eruption of herpes on the upper lip and the entrance of the nose. Nasal occlusion and symptoms of irritation of the eye and ear which disappeared after a few days.

VON EICKEN.

PHARYNX AND MOUTH.

514. EMERSON, F. P. *Sarcoma of the tonsil treated with Coley's toxins. Laryngoscope, March, 1907.*

515. ROBERTSON. Certain facts concerning faucial tonsils. *Jour. Am. Med. Assn.*, November 24, 1906.
516. LINK. Acute oedema of the pharynx with report of a case requiring rapid tracheotomy. *Medical Record*, March 2, 1907.
517. TRAUTMANN. Multiform exudative erythema of the mucous membrane in its relation to syphilis. *Münchn. med. Wochenschrift*, No. 43, 1906.
518. UFFENORDE. Lateral pharyngitis. *Arch. f. Laryngol.*, vol. xix., No. 1.
519. GOERKE. Consideration of the pathology of the tonsil. V. Critical remarks on the physiology of the tonsil. *Arch. f. Laryngol.*, vol. xix., No. 2.
520. MIODOWSKI. On the presence of actinomyces-like granules in the faucial tonsils. *Arch. f. Laryngol.*, vol. xix., No. 2.
521. CHAUVEAU. Aberrant tonsil behind the posterior pillar. *Arch. internat. d'otol.*, etc., vol. xxii., No. 3.
522. HENKES. Hemostasis after tonsillotomy. *Monatschr. f. Ohrenhkl.*, 1907, No. 2, p. 76.
523. BAUMGARTEN. Salivary stone of unusual size and recurrence. *Wiener med. Presse*, No. 3, 1907.
524. KRETSCHMANN. Disturbances in the throat caused by disease of the glands of the floor of the mouth. *Arch. f. Laryngol.*, vol. xix., No. 1.
525. PAPPENHEIM. Isolated one-sided spasm of the tongue. A contribution to Jacksonian epilepsy. *Wiener klin. Wochenschr.*, No. 6, 1907.
526. WEISZ. The combination of lactic acid and sunlight treatment in a case of tubercular ulcer of the lower lip. *Wiener klin. Wochenschr.*, No. 46, 1906.

514. EMERSON, FRANCIS P. *Sarcoma of tonsil treated with Coley's toxins.*

A spindle-celled sarcoma of the tonsil occurring in a woman sixty-four years of age was treated with the mixed toxins of bacillus prodigiosus and streptococcus erysipelatus with some success. The growth disappeared entirely and the patient regained good health, but she died seventeen months after treatment was begun from a recurrence of the tumor.

CLEMENS.

515. ROBERTSON, CHAS. M. *Certain facts concerning faucial tonsils.*

Eight (8%) per cent. of all tonsils examined were affected with primary tuberculosis, which enters through the crypts emptying into the supratonsillar fossæ, and furnished seventy-

five (75%) per cent. of tuberculosis of the tonsil, the infection taking place in the depth of the crypt. In this way the tonsils are the cause of general infection of the blood which may produce tuberculosis in any part of the body.

CLEMENS.

516. LINK, GOETHE. *Acute œdema of the pharynx, with report of a case requiring rapid tracheotomy.*

The patient had suffered with a simple attack of tonsillitis for ten days, and although the left tonsil was incised a number of times no pus was discovered. Digital examination of the throat showed bulgings of the anterior, lateral, and posterior walls. The lateral swelling increased rapidly after the examinations until the finger could be introduced but with difficulty. Intubation was impossible, so a rapid tracheotomy was performed while the case was unconscious. A vaginal hard rubber syringe tip was utilized as a tracheal tube. No sloughing nor suppuration followed the operation; the urinary analysis was negative and the case made an uninterrupted recovery.

CLEMENS.

517. TRAUTMANN. *Multiform exudative erythema of the mucous membrane in its relation to syphilis.*

Seven cases of old lues with recent multiform conditions in the mucous membrane of the mouth, pharynx, and larynx which resembled syphilitic changes but were diagnosed as multiform exudative exanthema. Treatment with salicylic acid brought recovery after a few weeks. The author believes that the infection of syphilis gives a predisposition to this erythema.

SCHEIBE.

518. UFFENORDE. *Lateral pharyngitis.*

The author believes that lateral pharyngitis does not depend upon primary neuritis, but upon inflammatory processes in the upper respiratory passages.

VON EICKEN.

519. GOERKE. *Consideration of the pathology of the tonsil. V. Critical remarks on the physiology of the tonsil.*

The lymphatic pharyngeal ring is a protective arrangement of the body which is shown by anatomic, physiologic, and clinical experiments. Hypertrophic tonsillar tissue must be

reduced. It is impossible to remove it radically, for there is always a regeneration of tissue as much as is necessary for the body. When the tonsils have no function to fulfil involution of the tissue takes place. VON EICKEN.

520. MIODOWSKI. *On the presence of actinomyces-like granules in the faucial tonsils.*

In 147 tonsils, structures were found in 12 which resembled actinomyces glands. They consist of a radially arranged network of hair-like fungi in which there are accumulations of cocci. VON EICKEN.

521. CHAUVÉAU. *Aberrant tonsil behind the posterior pillar.*

In a patient twenty-nine years of age on the right side at the posterior pharyngeal wall there was a pedunculated hard growth as large as the egg of a pigeon. Microscopic examination showed the tumor to be an aberrant tonsil.

OPPIKOFER.

522. HENKES. *Hemostasis after tonsillotomy.*

This method consists of uniting the two palatal arches over the bleeding tonsil. The two arches are united by clamps which are inserted by peculiarly constructed instruments.

WITTMACK.

523. BAUMGARTEN. *Salivary stone of unusual size and recurrence.*

A patient, forty-five years of age, presented on the left side of the floor of the mouth a pronounced swelling which was prolonged to the anterior part of the tongue. On incision pus was evacuated and in the depth there was a large stone weighing 1.26g consisting of phosphate of lime. Two years later the same symptoms returned with a similar stone.

WANNER.

524. KRETSCHMANN. *Disturbances in the throat caused by disease of the glands of the floor of the mouth.*

Many disturbances in the throat can be explained by pathological changes in the salivary glands in the floor of the mouth. The changes are usually of an inflammatory nature; rarely there is stasis of the secretion. The diagnosis is made

by the enlargement and tenderness of the organ, which can be easily palpated bimanually. The treatment consists of bimanual massage. WANNER.

525. PAPPENHEIM. *Isolated one-sided spasm of the tongue. A contribution to Jacksonian epilepsy.*

With the mouth open the tongue was observed to move 30 to 70 times a minute in a direction from left back to right front. The attacks lasted from 10 seconds to one minute. Synchronous with these spasmodic movements there was a softening of the right half of the base of the tongue and a diminution in size of the right half of the tongue; at the same time there were rhythmic contractions of the muscles passing from the inferior maxillary to the hyoid bone. The symptoms disappeared on the administration of bromides.

The author believes this to be a case of cortical epilepsy following the toxic action of alcohol. WANNER.

526. WEISZ. *The combination of lactic acid and sunlight treatment in a case of tubercular ulcer of the lower lip.*

The ulcer occupied the left half of the lower lip. It was treated with 20% lactic acid without result, then 25 to 50% lactic acid; following this, exposure to sunlight for about 80 hours altogether. The ulcer then healed. WANNER.

BOOK REVIEWS.

IV.—Diseases of the Ear. By HUNTER TOD, Aural Surgeon to the London Hospital, etc. Oxford Medical Manual. Price five shillings. 317 pages, crown 8vo. London: Hodder and Stoughton, 1907.

This is an excellent short introduction to the study of ear diseases. Each anatomical subdivision is taken up systematically with the necessary anatomical data, and instruction for the proper physical and physiological examination. The list of the diseases enumerated is sufficiently complete. The description of the functional examination is clear and the various methods are carefully described. Too much importance is perhaps given to Weber's and Gellé's tests. The surgical part is exceedingly well written. The description of the operations is clear and the indications are well defined. The intracranial complications are briefly described. The question naturally presents itself whether a much fuller description of these complications is not necessary to be of any value to the beginner in otology, or to the general practitioner; this of course the scope of the book does not permit. Perhaps the author will later see his way clear to write a text-book where brevity will not be so essential.

A. K.

V.—The Labyrinth of Animals. By A. A. GRAY, Aural Surgeon to the Victoria Infirmary, Glasgow. Vol. I., with 31 stereoscopic plates and stereoscope attached. Pages 198. London: J. & A. Churchill. Philadelphia: Blakiston's Sons & Co., 1907. Price, \$8.40.

"This work is designed to give, by means of stereoscopic photographs, a correct impression of the membranous laby-

rinth as found in a large variety of animals. It also enables the anatomist, the physiologist, and aurist to give demonstrations of the organ in a realistic and complete way, which is impossible by the ordinary methods of anatomical dissection."

These extremely beautiful pictures of the membranous labyrinth, that most graceful and intricate structure usually hidden to most eyes by its bony capsule, are a revelation which calls forth admiration for the enormous labor and remarkable technique expended on their preparation. It is the author's intention to present in two volumes the anatomy of the labyrinth of vertebrates except fishes.

The first volume, contrary to the usual rule, begins with the human labyrinth, gradually working downward in the scale of comparative anatomy, and includes the primates, cheiroptera, carnivora, ungulata, edentata, and rodentia.

Aside from the value of this investigation to comparative anatomy and physiology, the author believes it to make a double appeal to the aurist, especially introducing a new method of preparation. This method in brief is as follows:

The bony labyrinth is fixed in formalin solution after extraction of the stapes, washed in water, subjected to increasing strengths of alcohol. From absolute alcohol it is transferred to a mixture of equal parts of alcohol and ether, thin celloidin, xylol, and paraffin. After carefully scraping off the paraffin the specimen is decalcified in a mixture of nitric and hydrochloric acids. The bony capsule is easily removed and the membranous labyrinth preserved in xylol, in which it soon becomes perfectly transparent.

The actual appearance of the labyrinth in the different animals is described, the differences in the important structures explained, exactly measured, and the whole illustrated by stereoscopic photographs.

This magnificent work will prove a most interesting and fascinating study to all.

A. K.

VI.—Manual of Diseases of the Ear, Nose, and Throat. By J. J. KYLE, Professor of Clinical Otology, etc., in the Medical College of Indiana, etc. Second Edition, revised and enlarged,

with 169 illustrations. Philadelphia: Blakiston's Sons & Co., 1907. Price \$3.00.

This manual, of which a notice appeared in these *ARCHIVES*, Vol. XXXIII., p. 85, is now issued in a second edition after a relatively brief interval from its first publication. It has been revised and among the new matter added is a chapter on the diseases of the trachea and bronchi, including bronchoscopy. The many excellent features of the book previously commented upon make it one of the best of its class.

A. K.

VII.—A Manual of Diseases of the Nose, Throat, and Ear.
By E. BALDWIN GLEASON, M.D., Clinical Professor of Otology at the Medico-Chirurgical College, Philadelphia. 12mo, of 556 pages, profusely illustrated. Philadelphia and London: W. B. Saunders Company, 1907. Flexible leather, \$2.50 net.

This is a short treatise on these allied branches of medicine. The methods of examination are first given; after chapters devoted to the sterilization of instruments and the examinations of patients, the nose, pharynx, tonsils, larynx, and the ear are taken up in turn with reference to anatomy, physiology, diseases, and treatment. The text is clearly written, well illustrated, and the directions for treatment and operation are uninvolved, rational, and conservative. There is an unusual amount of information to be found in this small volume. The chapter on formulas deserves special notice. This is more exhaustive than usually found in books of this class, as it includes a detailed description of the more important drugs.

The book will be found extremely instructive and useful, and can be recommended.

A. K.

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